THE IRON AGE

THURSDAY, FEBRUARY 27, 1890.

The Chicago Elevated Railroads.

The Lake street elevated railroad is being pushed as rapidly as the receipt of material will permit. Vexatious hindrances are occurring through the delayed shipments of iron and steel by the mills. Several blocks have been erected, however, and the character of the work is now perceptible. It is a plate girder structure throughout, and is being built for two tracks. The original project contemplated the adoption of the Meigs or one-rail system, but this has been abandoned for the New York standard system. The foundations and posts are being completed very rapidly, that part of the work being far in advance of the work on the superstructure. As this is the pioneer elevated railroad of Chicago it attracts much attention from the citizens, who gather daily in crowds to see the progress made by the builders, Cofrode & Saylor, of the Philadelphia Bridge Works.

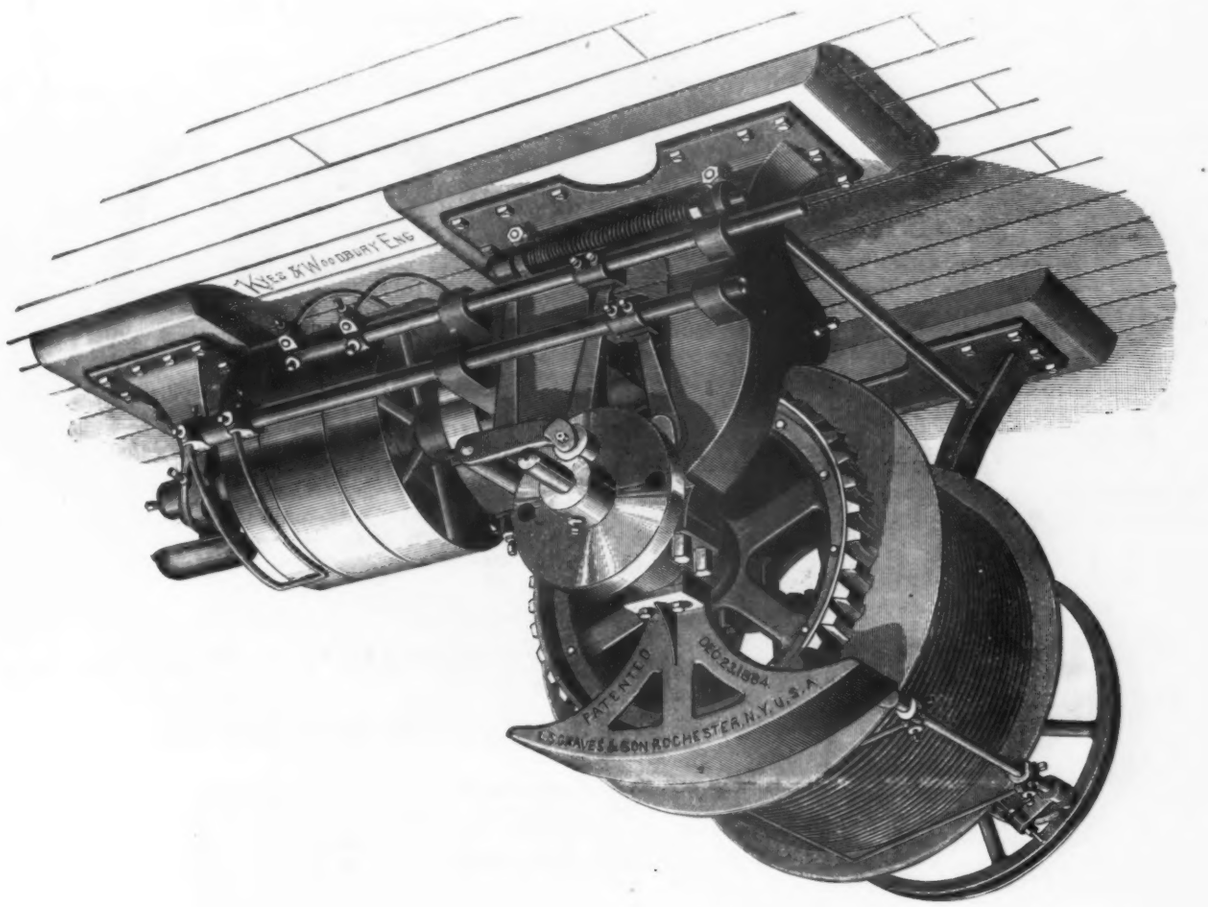
On the 10th inst. the construction of the South Side or Alley Elevated Railroad was begun by a force of men who were put to work on the foundations. The superstructure is to be built by the Keystone Bridge Company, of Pittsburgh. Large shipments of the iron and steel are under contract to be delivered February 25, and the work of erecting is expected to commence on the following day. The first mile is to be completed by March 25. In acquiring the right of way the elevated company found it necessary to purchase a number of buildings, which are now sold for what they will bring, with the stipulation that they will be removed within 48 hours after the purchase.

The third elevated project in Chicago contemplates a system on the west side of the city, south of the territory to be reached by the Lake street line. An ordinance was passed by the City Council on the evening of the 10th inst., authorizing its construction. The terminus will be in the heart of the city, and the Chicago River will be crossed by a double-decked bridge. The plans have been nearly completed, leaving only details to be arranged, which can soon be done. The structure is to be of the most approved style, similar to the extension of the Second avenue line in New York and the Kings County line in Brooklyn. It is locally known as the Randolph street elevated, although branches will be operated on several other of the principal streets on the west side. The superstructure will be built of steel. Plate girders are to be used, with occasional lattice girders where the street crossings are exceptionally long. E. L. Corthell has been the consulting engineer, and will doubtless be engaged to complete the work. This is a more ambitious project than the two others above referred to, and will require much more iron and steel in its construction.

Elevated railroads cannot be held liable for damage caused by the noise they make, according to a decision of the Supreme Court in Philadelphia last week, if the road is operated without negligence or malice.

Hanging and Floor Elevators.

We here present engravings showing two adaptations of the steel screw belt elevators built by L. S. Graves & Son, of Rochester, N. Y. The first engraving shows the machine secured to the ceiling overhead in its working position, near the hatchway, while in the second one it is placed on the floor. In these machines the screws are made from solid cast-steel forgings, while the screw gears are made from the best anti-friction metal, copper and tin. These two essential parts, upon which the whole machine depends for safety and durability, are cut and fitted to work accurately together. In the first overhead machines of this style constructed the screw was placed under the screw-wheel in an oil-pot. As this method hid the workmanship and made it impossible to readily ascertain the condition of the parts, it has been changed in later patterns and the positions reversed by placing the screw above the screw-wheel, thereby depending solely upon new oil for lubrication, keeping all the parts in plain sight and concentrating all the strain in the strong part of the frame. This also permitted the keeping of the drive belts high out of head room. The thrust bearings are of the hardest composition or bell metal. The loose pulleys are cast with recesses and bushed with hard composition, and around this bushing is a reservoir for self-oiling. The screw-wheel, which is bolted directly to the rim of the winding drum, is made of anti-friction composition. The machines are fitted with a patent



STEEL-SCREW HANGING MACHINE.

automatic stop motion, which permits the winding drum to make only the number of revolutions necessary for the travel of the car, when it is stopped without any connection with the shifting cables. The floor machines and the larger sizes of hanging machines are fitted with a patent slack-cable stop motion, which prevents any accident by the unwinding of the cable should the car meet with any obstruction in its descent. It will be observed that both machines are compactly and powerfully built, and in the case of the floor machines the parts are erected and bolted to a cast-iron bed-plate.

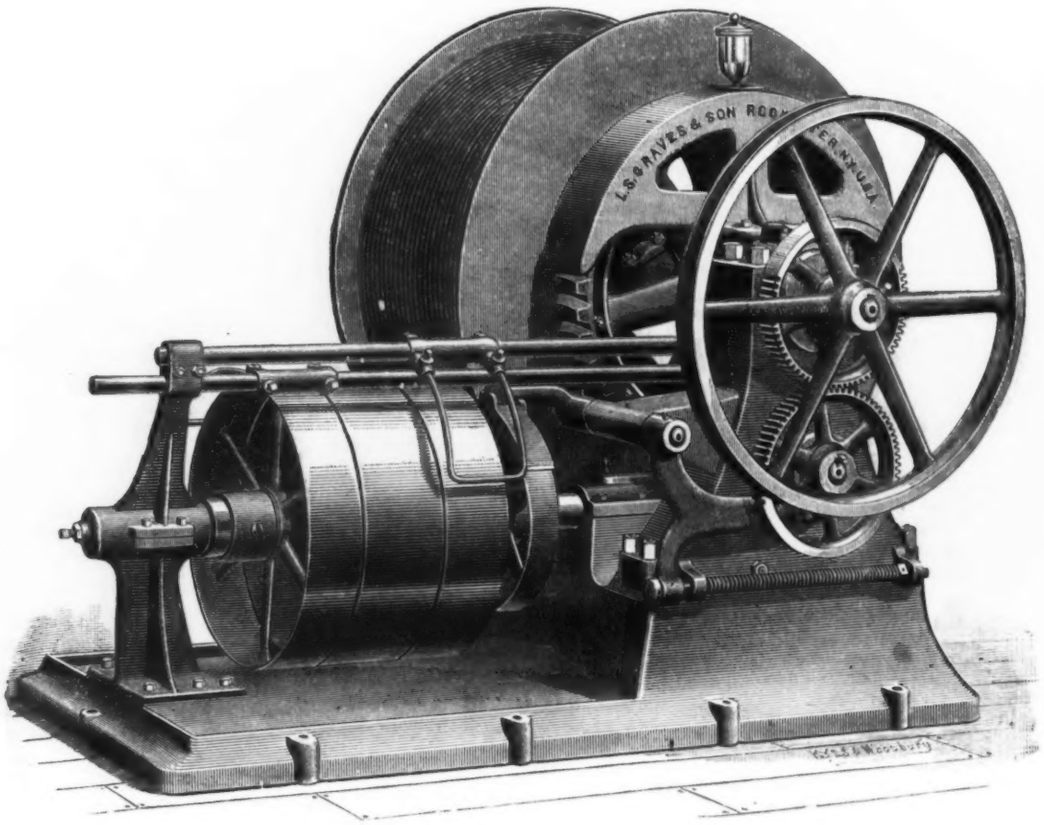
Powerful Engines.

The New York, Providence and Boston Railroad Company have contracted for five more locomotives, two moguls and an eight-wheeled engine for the Worcester division and two standard engines for the Providence–New London line. Four of these are being built by the Rhode Island Locomotive Works and one at Manchester, N. H. Probably the most interesting machine in the list is the express passenger locomotive. The specifications call for as fine an engine as can be put together in the works; the best of material only to be used, the latest and most improved fittings are included and the work is to be subject to the inspection and approval of the master mechanic. The engine will be remarkable as having the largest pairs of driving wheels running in the State. The boiler will be of Otis steel, ½-inch thick, 54 inches in diameter at the smoke-box end, made wagon top with a 60-inch extension arch, tested to 225 pounds steam pressure and intended for a working pressure of 180 pounds to the square inch. The tubes are of Franklinite iron. The fire-box is Otis steel, flue sheet ½ inch thick and throat sheet ⅝ inch thick. The four upper rows of stay bolts are to be doubled and drilled with telltales $\frac{3}{16}$ x 1 inch. The engine is to be furnished with a brick arch on water tubes. On the frames the pedestal boxes are to be of deoxidized copper bronze. The piston heads are fitted with Dunbar packing, piston rods of cold-rolled steel forced into piston straight fit, and screwed with a nut. The Dean patent guide is to be used and the crossheads are to be of cast steel. The valves are the Richardson balanced, rods are of Otis steel, parallel rods solid ended, and all rod brasses are to be Damascus bronze. The latest and best form of steam bellringer will be used. Boiler, cylinders and dome will be logged with asbestos. The injectors will be two No. 9 Mack, the Westinghouse automatic brake will be provided for drivers, tender and train. The front end is carried on the four-wheeled center-bearing truck with ball-bearings. The bottom center is 5 or 6 inches deep, and will contain a hardened steel plate ¼ inch thick in the bottom, then ½-inch globes of hardened steel and another steel plate for the upper bearing. The truck wheels are to be of steel, spoke pattern. The tender axles follow the master carbuilders' standard with size increased ¼ inch everywhere. The engine has a 23-inch buck headlight with illuminated number of the engine. The whole machine is soberly finished in dark bottle-green with plain gold stripe. Its main dimensions in tabulated form are as follows:

Cylinders	18 x 24 in.
Driving-wheel base	9 ft. 1 in.
Engine-wheel base	23 ft. 1⅜ in.
Total wheel base, engine and tender	45 ft. 5⅛ in.
Weight, working order	98,000 lbs.
Weight on truck	64,500 lbs.
Boiler, ⅛-inch steel, diameter	54 in.
Tubes (218 2 in. O. D.), length	10 ft. 7 in.
Fire-box	78 x 35 in.
Driving-wheels, diameter	73 in.
Driving-axle journals	7½ x 8 in.
Truck-wheels, diameter	33 in.
Tender truck-wheels, diameter	36 in.

The two moguls correspond in most respects to other engines from the same shops which Mr. Griggs had put in service when that division was the Providence and Worcester road, and the Providence and Worcester specialties are still retained. These engines will have the Richardson driving balanced valves, with hammered iron rods with Damascus bronze brasses, Damacus bronze linings for driving and truck boxes, Boies steel-tired wheels in pony truck and under tender, Luttgens exhaust damper at base of P. and W. pattern stack and Eames vacuum brake for all pairs of drivers and for the tender. The dimensions of these capable engines are:

Cylinders	18 x 24 in.
Driving-wheels, diameter	58 in.
Driving-wheels, base	15 ft. 2 in.
Engine-wheels, base	22 ft. 10 in.
Total wheel base, engine and tender	45 ft. 11½ in.
Weight, working order	108,000 lbs.
Weight on drivers	93,000 lbs.
Weight on truck	15,800 lbs.
Boiler, 7-16 in. steel, diameter	52 in.



STEEL-SCREW FLOOR MACHINE.

Tubes (200 2 in. O. D.), length	10 ft. 5¼ in.
Fire-box	78 x 35½ in.
Driving axle journals	8 x 9 in.
Radial truck and tender wheels, diameter	33 in.

The standard eight-wheeled engine for the Worcester division has the Richardson balanced valves and all the P. and W. specialties applied to previous engines for this road. The engine truck is center-bearing rigid motion. As in the moguls, Damascus bronze linings are called for for driving and truck boxes. The Eames vacuum brake is used on drivers. Westinghouse automatic air-brake for tender and train, also Westinghouse automatic conductor signal and regulating valve attachment. The Siebert lubricator oils the cylinders, the Luttgens exhaust dampers, which are well liked on this division, are used and an extra Westinghouse starting valve is to be placed on the left side for steam heating. The dimensions of this engine are:

Cylinders	17 x 24 in.
Driving-wheels, diameter	62 in.
Driving-wheels, base	9 ft. 1 in.

Engine-wheels, base	23 ft. 9 in.
Engine truck, diameter	28 in.
Tender truck, diameter	30 in.
Weight, working order	97,000 lbs.
Weight on drivers	67,000 lbs.
Weight on truck	30,000 lbs.
Boiler, 7-16 in. steel, diameter	52 in.
Tubes (200 2 in. O. D.), length	11 ft. 10¾ in.

British Tin Plate Exports for 1889.

The export of tin plates and sheets from the United Kingdom for 1889 exceeds that of any previous year in the history of the trade. Over 430,000 tons were exported, representing an aggregate value of over £6,000,000. For the month of December the quantity of exports was below the average for the year, reaching only 29,232 tons, but with the holidays and what not the last month of a year is seldom a typical one. The statistics showing the volume of trade for the 12 months are as follows:

To	Tons.	Values.
Holland	3,795	£56,234
Germany	4,179	62,174
France	4,322	62,696
Australasia	6,620	91,726
British North America	15,385	214,338
United States	336,692	4,674,455
Other countries	59,630	862,873
Totals	430,623	£6,030,496

It will be instructive to compare the figures for the year just ended with those of the two years which preceded it.

	Tons.	Values.
1887	353,506	£4,792,854
1888	391,361	5,546,228
1889	430,623	6,030,496

No better testimony to the vitality and the development of the tin plate industry need be sought after. In consequence of the development of the exports of tin plates from Swansea, the harbor trustees are taking steps to extend the already extensive storage accommodation at the East Dock.

Southern Miscellany.

The iron mines near Sheffield, Ala., belonging to Alfred Parish have contracted to supply 12,000 tons of ore per month to the furnaces of the Tennessee Coal, Iron and Railroad Company, that are located at Birmingham and Ensley City. It is from this ore that the 5,000 tons of pig was made that was recently shipped by barges up the Tennessee River to Pittsburgh, Pa.

The Shelby Iron Works of Shelby, Ala., have been sold to a party of Anniston capitalists, headed by the Anniston banker, Duncan T. Parker. The purchase includes two charcoal furnaces and 50,000 acres of fine mineral lands. The price paid was $900,000. It is intimated that Mr. Parker is acting as agent for wealthy London capitalists who wish to secure all of the charcoal furnaces now operating in North Alabama.

In order to open up new mineral properties the East Tennessee and North Alabama Coal and Iron Company intend constructing a short railroad about 20 miles in length. They also contemplate the erection of 200 coke ovens, and to do so are considering the increase of their capital stock to $1,500,000. The company own extensive tracts of coal and iron lands in Cumberland and Bledsoe counties, Tenn.

The Decatur, Ala., Iron, Land and Lumber Company are developing newly acquired iron properties in Murphree's Valley, on the Huntsville branch of the Birmingham Mineral Railroad. The first furnace of this company will be blown in next week.

Piedmont, the new Alabama iron town that is being built by Delaware capitalists, is to have two 100-ton coke iron furnaces and a basic steel plant. Negotiations for their erection are now pending.

Rumors of the probable change of ownership of the Sheffield Land, Iron and Coal Company come from Sheffield, Ala.

The coke furnace of the Birmingham Furnace and Mfg. Company, located at Trussville, Ala., has been bought by H. T. DeBardeleben, of Bessemer, Ala.

Mineral lands near Woodstock, Ala., have recently been purchased by the Tennessee Coal, Iron and Railroad Company, which concern will soon begin developments.

A Chattanooga company have purchased iron properties in Little Wills Valley, Ala., and have commenced operations.

The Cherow, S. C., Iron Works Company have increased their capital stock, and will enlarge their capacity.

The Charleston, Cincinnati and Chicago Railroad Company contemplate the erection, at Johnson City, Tenn., of extensive railroad machine shops, which will cost in the neighborhood of $500,000.

Extensive machine shops are to be erected at Laredo, Texas, by the International and Great Northern Railway Company.

Much new machinery is to be added to the iron-working department of the Southern Car Works, at Knoxville, Tenn.

The Trenton Foundry and Machine Shops is a new iron establishment to be erected at Trenton, Tenn., by Messrs. J. M. Skiles & Co., who are probably in the market for machinery.

Messrs. Fair & Day, of Knoxville, Tenn., are building a foundry and machine shop.

A coke furnace is to be built at Spring City, Tenn., by English capitalists.

Rockwood, Tenn., is to have a furnace. The Roane Iron Company will build it.

Albert Wallace, of Franconia, N. H.; Andrew Williams, of Plattsburg, N. Y.; J. H. Coulter, and others have organized the Sequatchie Valley Coal and Iron Company, and have bought 32,000 acres of coal and iron lands near Owen, Tenn.

The Bridgeport and Decatur Mining Company, with a capital stock of $200,000, have been formed at Bridgeport, Texas. Iron properties will be developed.

The Etowah Iron Company, of Cartersville, Ga., have projected a narrow gauge railroad from their furnace to the mines, and are now in the market for rolling stock.

The ironwork for the bridge to be built at Ahalt, Md., one mile from Frederick, was received this week and will be shortly put into position. It is to be a high truss bridge 130 feet in length, and will be the longest single span bridge in the valley.

Germany's Pig Iron Output in 1889.

—*Stahl und Eisen* reports that the pig iron production in Germany during the year 1889 presents the following record:

	Total production.	Puddled pig and spiegeleisen.	Bessemer pig.	Basic pig.	Foundry pig.
	Tons.	Tons.	Tons.	Tons.	Tons.
1889...	4,387,524	2,047,677	405,490	1,402,444	538,893
1888...	4,337,121	1,898,125	1,794,806	628,293	15,897
1887...	4,023,953	1,756,067	1,732,414	520,524	14,878
1883...	3,469,719	2,002,195	1,072,357	379,642	15,524
1880...	2,729,038	1,732,750	731,538	248,302	16,447

The total output for 1889 is seen not to exceed greatly that for 1888, but the changes shown in production of different varieties are noteworthy.

John McLauchlan, 59 Dearborn street, Chicago, manager of the Western office of Andrews Bros. Company, has issued a remarkably neat pamphlet, setting forth the various products of his firm. The pamphlet is illustrated with lithographic designs, calling attention to the company's sheet iron and sheet steel, pig iron, cold-straightened bars for shafting purposes, &c. The pages are interspersed with a large number of voluntary testimonials from consumers to the merits of Hazelton pig and bar iron.

Improved Ore-Handling Facilities at Marquette.

The enormous shipments of iron ore from the Lake Superior region demand increased facilities for handling ore at the various shipping points. The following description of a new ore dock to be erected at Marquette, Mich., is taken from the *Mining Journal* of that city:

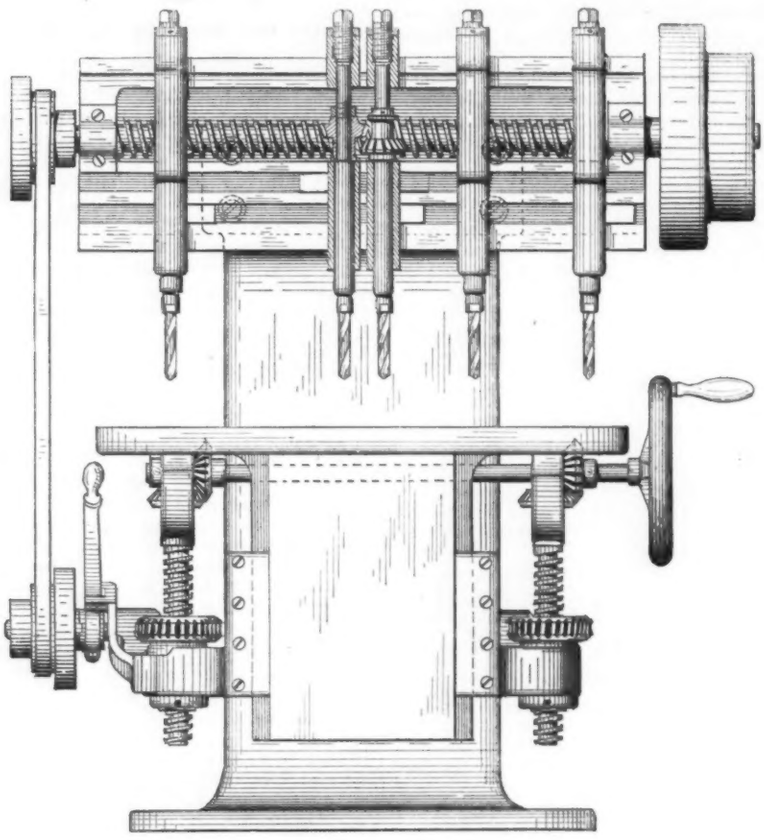
The contract for the new, or No. 4, ore dock of the Duluth, South Shore and Atlantic, at the foot of the Jackson cut, was let yesterday by General Manager Fitch to Henry & Balch, of Minneapolis, who built the great Ashland and Gladstone docks. The new dock will have 200 pockets, a loading length of 1200 feet, and a total length, with approach, of 1760 feet. This with the 300 feet extension of No. 3 dock will more than double the present loading capacity. The contractors have agreed to have the entire work finished by June 15. Vessels can be loaded from the pier at an earlier date, however, as the dock will be completed as it goes out. Thus while the builders are still at work on the outer end cargoes of iron ore can be sent thundering into the holds of vessels moored near the shore.

Some points in construction call for special notice. The first of these is an improvement in pocket partitions, designed by Chief Engineer Payne. Hitherto these partitions have been made by planking on framework, thus forming a dead-air space in each partition and consequent unavoidable decay and subsequent weakness. In the new dock these partitions will be formed of vertical 6 by 12 timbers resting on the rafters of the pocket floor, thus obtaining equal or greater strength, avoiding the rot-producing dead-air space, increasing pocket room and saving expensive repairs. Six rails will be placed on the dock, all laid to gauge, thus giving five tracks. In order to save pocket floors ore will first be dumped from the second or inner tracks; then as the pockets fill the cars will drop their loads from the outer tracks. The pockets will hold from 135 to 140 tons of ore each. The chutes and hoists will be of the latest design, with counter-weights. In fact, the dock will be equipped throughout with the latest and best of loading devices. Some idea of the magnitude of the work may be gathered from the fact that over 4,000,000 feet of lumber will be required, not including piles.

The new pile-drivers are merrily at work on the extension of No. 3 dock. The scow plan has been abandoned and the divers now advance upon the piles as they drive them. This improvement will probably be finished early in May. No. 3 dock will be further improved by building a curved approach from the southward, thus enabling trains to be handled more rapidly and easily and avoiding much of the blockade at Front and Superior streets. The South Shore line is now building at its shops 200 of the latest improved 20-ton ore cars. Last year this railroad had more ore business offered it than it was able to handle. Thus iron that should have been shipped from Marquette was forced to Escanaba and other points. With the present increase in its facilities made by the enterprising South Shore line Marquette becomes an excellent second among the ore shipping ports, easily passing Ashland in the race. With short rail haul and lowest lake rates combined Marquette is destined to become and to remain the greatest ore-handling city on Lake Superior.

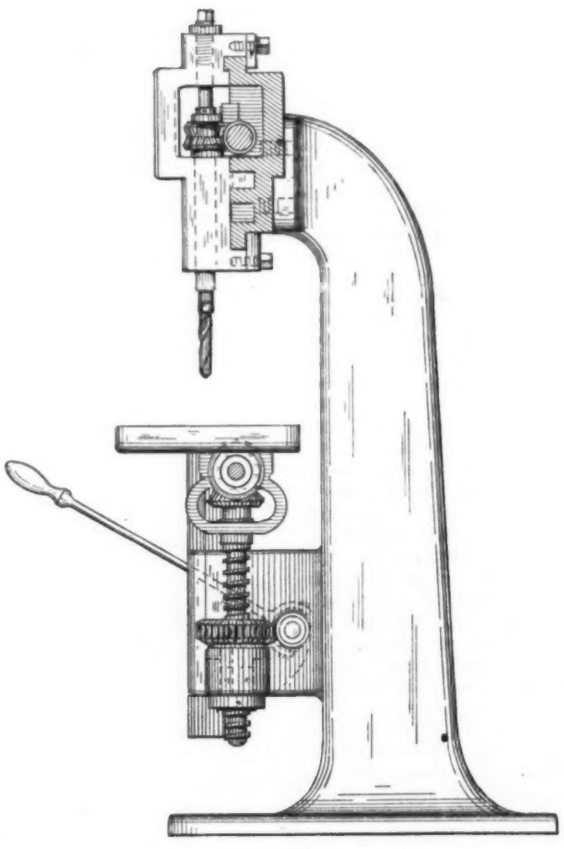
Multiple Drilling Machine.

This machine is designed to simultaneously drill a series of holes, some of which are in close proximity to others; it also provides for the readjustment of the drills with their driving spindles, for the drilling of holes at various distances apart. The slide carrying the table on which the work to be drilled is placed moves in vertical ways on the frame. In these ways is mounted a feed-shaft formed with a worm at each end which engage with worm-wheels secured to revolving nuts, as shown in both drawings. The shaft is driven by a clutch pulley, and through the revolving nuts and vertical feed-screws raises and lowers the table, to which the upper ends of the screws are journaled in brackets. Journaled in bearings in the brackets is a coupling shaft geared to the feed-screws by similar pairs of gears and provided with a hand-wheel at one end in order that the feed-screws may be turned by hand. This mechanism permits the moving of the table vertically either by hand or power.



Multiple Drilling Machine.—Front Elevation.

That part of the frame carrying the drilling device consists of a crossbeam in which is journaled a worm shaft. This principal driving shaft has at one end a pulley by which it is driven, and at the other end a pulley for carrying the feed belt for driving the lower feed pulley. The spindle heads carrying the drills are adjustably secured upon the front of the beam and the driving worm meshes with a worm-wheel on each spindle These worm-wheels are placed on the spindles alternately above and below the center line of the worm, so that they can overlap each other and allow of the spindles being set more closely than would otherwise be possible. As the spindle heads are narrow and of considerable hight, some guide is required to keep them vertical in addition to their short contact upon the upper and lower edges of the beam. Accordingly, in the lower edge of the beam are formed two grooves, in one or the other of which slide guide bars attached to the heads. As the guide bars are in comparatively narrow grooves (vertically), and as they are much longer than the width of the heads, they furnish a firm guide for maintaining the heads in proper alignment. By slackening the screws shown in the the end view, and which bind the heads to the beam, the spindles may be slid to any desired position on the beam, their worm-wheels rolling in the worm as a gear in a rack. This machine is the invention of Francis H. Richards, of Hartford, Conn., and has been assigned to Eckley B. Coxe, of Drifton, Pa.



End Elevation.

Schwab & Sercomb, of Milwaukee, Wis., manufacturers of machinery, are bringing out an article which will be of very considerable value to instructors who desire to teach the principles underlying the operations of an engine. They call it Instructor No. 1. It consists of a portion of the machinery of an engine so constructed as to show the valve and link motion, how steam is received and discharged, &c. It is a reproduction in miniature of what might be termed a section or one side of an engine. It is intended for the benefit of machinists, firemen, trade schools, mechanical engineers, &c. The instructor will be ready in the course of a few weeks. The cost will not exceed $10 apiece. The same firm have brought out a horse-power mowing machine, named the Violet mower. It has met with much favor, 12 having been made last year on trial. The prospects in this direction are regarded by the firm as very flattering. They are very busy in their foundry at present, making a large number of heavy castings for the Illinois Steel Company.

The Illinois Steel Company give out the following report: The total value of finished products shipped in the eight months of 1889 after the organization was $15,275,529. The company received a total of 2,048,688 tons of raw material and shipped over 500,000 tons of finished products. The total pay-roll amounted to $3,660,888, and the purchases of miscellaneous stores and supplies of all kinds amounted to $693,000. The company received 88,554 cars of material and shipped 40,954 cars. There were employed directly at all the works on an average per day 8360 men, beside the employment given indirectly to a large additional force in the production of coke, coal, iron ore, limestone and other materials.

The Properties of Aluminum--I.*

BY ALFRED E. HUNT, JNO. W. LANGLEY AND CHAS. M. HALL.

Purity of Aluminum.—A great deal that has been written heretofore about the properties of aluminum is of doubtful value, owing to the lack of knowledge we have of the purity of the aluminum referred to. Much of the metal heretofore sold in the markets as pure aluminum has been contaminated with 4 to 10 per cent. of impurities. Indeed, it is only within a very few years that a purer metal than 96 % aluminum has been made upon any larger than a laboratory scale.

The works of M. Pechinet, of the Société d'Anonyme d'Aluminium, at Salinderes, near Marseilles, in France, have longest enjoyed the reputation of making the purest aluminum placed upon the market. The method employed is essentially Deville's, reducing chloride by aid of metallic sodium, the same as practiced by the Aluminium Company, Limited, at Oldbury, in England, and with the modification of using aluminum fluoride, instead of aluminum chloride, to be reduced by the sodium, is the method pursued by the Alliance Aluminium Company, of Wallsend-on-Tyne, in England.

The Pittsburgh Reduction Company, manufacturing under the Hall process, reduce the metal from aluminum oxide, alumina (Al. 203), by electrolysis, this alumina being held in solution by a molten fluoride bath, which itself is not decomposed by the electric current, which is conveyed to the melted solution by means of carbon cylinders placed in the bath for positive electrodes, a carbon-lined pot forming the negative electrode. The oxygen of the alumina goes off at the positive electrode as carbonic acid, wearing away the carbon at the rate of nearly a pound of carbon to the pound of aluminum produced. The reduced metal settles to the bottom of the pot, from which it is easily tapped or ladled off, practically free from the electrolyte, a second remelting entirely purifying from it.

All four of these concerns have succeeded in making aluminum of over 99 per cent. purity, although it is only with careful selection of materials and the greatest care to prevent contaminations that metal of this purity is obtained by any of these. All of these concerns have succeeded in regularly placing upon the market metal in considerable quantities of over 98 per cent. purity; and these are the only concerns, so far as has reached the knowledge of the writers, who have done so.

The impurities of the metal made by "the sodium process," as practiced by the first three mentioned concerns, have been nearly half iron and half silicon. With the Pittsburgh Reduction Company the impurity consists almost entirely of silicon, the iron being less than $\frac{1}{10}$% of 1 per cent. In the first three-quarters of the month of December, 1889 (the plant was shut down for repairs, the first time since November 28, 1888, from the day before Christmas until New Year's) 1250 pounds of aluminum was made by the Pittsburgh Reduction Company, all of which was over 98.25 per cent. aluminum, with less than 0.10 per cent. iron, and with about 1.50 per cent. silicon, and quite an amount of this metal was over 98.75 per cent. aluminum. The singular fact is that quite a portion of the silicon in it exists in the graphitoidal state.

A sample lot of aluminum made by the Pittsburgh Reduction Company, taken as fairly as possible, representing the average metal made by this company, was submitted to many physical tests, which are reported in various parts of this paper. For purposes of identification and brevity this metal will be referred to as "the average lot"—98.52 per cent. aluminum. The metal was of the following analysis:

	Per cent.
Aluminum	98.52
Silicon, combined	0.42
Silicon, graphitic	0.72
Iron	0.05
Copper	0.06
Lead	0.04
Arsenic	None.
Sulphur	None.
Phosphorus	None.
Calcium	Trace.
Sodium	Trace.

Properties with Reference to Specific Gravity.—One of the most striking properties of aluminum is its lightness, which for many reasons makes it comparable in value with metals costing one-fourth as much. The following table of specific gravities of aluminum, with authorities, is given:

Quality, make and condition of the aluminum.	Specific gravity compared with water at 40° C.	Authority.
Cast metal	2.56	Roscoe and Schorlemmer.
Hammered metal	2.67	
Cast metal	2.60	Guetier's metallic alloys.
Heated to 100° C. and cooled	2.65	Richard's aluminum.
Cast metal, absolutely pure	2.60	Deville.
Cast metal, absolutely pure	2.583	Mallet.
Sample sawed out of center of cast ingot	2.587	Pittsb'gh Testing Laboratory
Same annealed	2.602	
Aluminum casting 92.57 al., 3.28 si.	2.807	
Rolled bar, 92.25 al	2.761	
Average lot 98.53 al. casting	2.610	
Average lot 98.53 sheet	2.710	
Average lot casting	2.587	John D. Langley.
Average lot rod	2.703	

A sheet of aluminum 12 inches square and 1 inch thick weighs 14.03 pounds. A bar of aluminum 1 inch square and 12 inches long will weigh 1.17 pounds. A bar of aluminum 1 inch in diameter and 12 inches long will weigh 0.918 pounds. A cubic inch of cast aluminum weighs 0.092 pounds.

	Pounds.
A cubic foot of cast aluminum weighs	158.967
A cubic foot of soft steel weighs	490.450
A cubic foot of wrought iron weighs	485.874
A cubic foot of copper weighs	554.988
A cubic foot of ordinary brass weighs	524.160

Aluminum has about the tensile strength of cast iron, with only about one-third of its weight, and casts equally as easily and successully, and will therefore be very advantageously used to replace cast iron in the parts of moving machinery that have to be reversed or otherwise have their momentum overcome; for with one-third the weight, and consequently one-third the momentum, aluminum will work very satisfactorily.

Action of Heat.—Pure aluminum melts and becomes fluid at about 1200 degrees Fahrenheit. The amount of impurity in aluminum materially alters its melting point. One per cent. of iron raises the melting point over 100 degrees. It does not remain firm like lead almost to the fluid point, and then suddenly give way, but has a stage of from 1000° Fahrenheit to 1200° Fahrenheit, in which the metal becomes pasty, loses much of its power of cohesion, and during which stage, if the metal be gently pressed together, it can be readily welded. It is, however, very red-short at this temperature, and will not stand hammering to weld the metal without crumbling down. If the metal is not held too long a time in this pasty condition it does not seem to become injured after being again cooled down.

The Thomson Electric Welding Company have no difficulty in satisfactorily, rapidly and cheaply welding aluminum in such ways that the welded strip will break in the body of the bar, by their admirable machines.

Aluminum in a compact mass is an absolutely "fixed" metal at any temperature attainable by combustion of carbon in the most approved furnace, although in thin beaten foil aluminum burns in a current of oxygen gas. An experiment made by Professor Langley, by heating a weighed amount of aluminum in a carbon-lined crucible for several hours in a Sefstrom furnace, at a temperature considerably above the melting point of steel, showed that the resulting buttons of aluminum contained all the original aluminum melted, plus several per cent. of carbon, which formed a tenacious, closely-adhering skin upon it. The metal, however, had become quite brittle and had largely lost its cohesive powers. Deville, Watts and Fremy all say that aluminum is absolutely fixed at all temperatures and loses no part of its weight when highly heated.

Aluminum remains in a molten condition without any slag over it, and requires no flux; indeed, most fluxes are absolutely injurious in that they assist the metal in absorbing silicon and iron from the lining walls of the containing crucible. Charcoal and other light substances, which are sometimes used to cover the molten bath, are very difficult to keep from contaminating the castings, and are of no use whatever.

Molten aluminum takes a very thin coating of oxide of aluminum on its surface, which seems to protect the liquid metal underneath it. This thin coating can be discovered by drawing a rod of aluminum across the surface of the bath and noting the brighted surface of the metal in the stroke made by the rod parting the surface film. It is not our experience that this film of oxide is of serious consequence in preventing sound castings or causing flaws in rolled sheets or bars.

Aluminum had best be melted in first quality plumbago crucibles, from which it absorbs only about 0.25 per cent. silicon with each remelting. In melting in clay, Battersea or other silicious crucibles aluminum becomes very seriously contaminated with silicon. For purposes where it is especially desirable to retain the purity of aluminum it is best to remelt in crucibles brasqued or lined with a mixture of finely ground, "dead burned," calcined, pure magnesia, with just enough boiled tar to give it sufficient plasticity, this mixture entirely preventing the molten aluminum from coming in contact with the silica in the clay of the crucible wells. Heated in an atmosphere of chlorine gas, aluminum burns to a chloride. Moist chlorine gas, even in the cold, acts energetically upon aluminum.

Aluminum is most malleable at a temperature between 200° and 300° F., although it can be rolled cold with frequent annealing. It should not be worked at a temperature above 400° F., for it becomes very red-short at a temperature a little above this point. Aluminum becomes quite hard by work upon it, either by cold-rolling, hammering or drawing. Through wire dies it assumes nearly double its normal tensile strength, although it does not, like steel, lose proportionately as much of its "ductility" as measured by the flow of the metal in reduction of area at point of fracture. In rolling or drawing aluminum, like the precious metals, it requires frequent annealings to prevent its cracking.

This annealing is accomplished by heating the metal to a temperature of about 800° F. It is a temperature at which a

* Read at the Washington Meeting of the American Institute of Mining Engineers.

thin bar of iron placed in the muffle will just appear slightly red on a dark day or at twilight. The aluminum at this temperature should not appear at all red. This temperature can best be determined in a practical way by drawing a soft pine stick across the surface of the aluminum to be annealed; it should leave a black mark from the charring of the wood, which should burn off very slowly or not at all. After being heated to this temperature the metal should be allowed to cool off very gradually, although a very satisfactory annealing of light articles can be attained by plunging them in water of between 60° and 100° F. For some articles, where it is necessary to keep the heat down below the point where the metal would sag or lose its shape, a very satisfactory annealing can be done by heating the articles in boiling linseed oil and allowing them to gradually cool with the oil. Very thin sheets and wire can be annealed by plunging into boiling water and allowing to cool with the water. Aluminum as annealed is very soft and pliable indeed; in fact, as compared to its tenacity, it is probably the most pliable of metals.

Aluminum, on slowly cooling from fusion, crystallizes in octohedrons, and castings on fracture show a fine-grained crystalline structure. Pulled in a testing machine the fracture shows granular. An ingot of aluminum, high in silicon, was melted in a plumbago crucible and one portion cooled in a very cold and thick-walled ingot mold into a very thin ingot, in a way to give the metal as much of a chill as possible; the other portion of the metal was cast in a hot mold and into a thin ingot. The metal of the outside of each ingot was analyzed, with the following results:

	Metal chilled rapidly. Per ct.	Metal cooled slowly. Per ct.	Original metal as first made. Per ct.
Aluminum..... ...	96.55	96.52	96.60
Iron..	0.24	0.24	0.24
Combined or amorphous silicon.....	1.08	1.34	1.24
Graphitic silicon..	2.13	1.90	1 92

So far as it will be fair to generalize from this single experiment, graphitoidal silicon is not rendered amorphous, or combined, as would be the case in chilled iron under the same circumstances. To support this view, no appreciable difference in hardness can be determined between surfaces of ingots cast in chills over those cast in hot molds. The specific heat of aluminum is 0.2143, water being taken as 1.000. Aluminum follows the general rule of specific heats—that they are inversely as the atomic weights. The co-efficient of linear expansion, as determined by one of the authors of the paper, of rolled rods of aluminum, of the analysis quoted of 98.53 per cent. aluminum, approximately per degree Centigrade between the freezing and boiling points of water is 0.0000206, that of wrought iron by the same method being 0.0000122. From this it is apparent that aluminum has a co-efficient of expansion closely approaching that of tin and higher than copper, which is .0000718.

Sound castings can be readily made of aluminum, using dry sand molds. The molds can be advantageously lined with plumbago. The metal should be poured quickly, and at very little above the melting point; otherwise the castings will be unsound. Molten aluminum flows readily, and not much larger gates are needed than with brass. The shrinkage of average aluminum castings made by the Pittsburgh Reduction Company is about $0.\frac{17}{64}$ inch to the foot, as measured by an Olsen's shrinkage testing machine. The shrinkage can be reckoned to be about 2.26 per cent.

Corrodibility.—Aluminum becomes covered by a very thin, almost imponderable coating of oxide on its surface exposed to the atmosphere, which seems to protect it from further oxidation. This coating is so thin as to hardly in any way interfere with the surface polish which the metal takes, and does not change the weight of the metal, as determined by the most delicate of chemical balances.

In the chemical laboratory of the Pittsburgh Testing Laboratory we have a thin weighing-scoop hammered out of an aluminum sheet which weighed 2.2086 grams eight years ago. It has not changed in weight one-tenth of a milligramme since. The popular general statement that aluminum is unacted upon by air, either moist or dry, or by water, is practically true. According to Deville, water has no action on aluminum, either at ordinary temperatures or at the boiling point. The accuracy of this statement the authors have very frequently verified, finding aluminum wire subjected to the action of steam and heated air to retain its original polish, and not to lose weight, after 6 hours' exposure.

Aluminum containing sodium is rapidly acted upon by hot water, dissolving out the sodium and leaving the aluminum spongy and weak, fit only to be remelted, whence it comes out purer and better in quality for its freedom from the sodium. Aluminum is unacted upon by either concentrated sulphuric or nitric acids; hydrochloric acid is its natural solvent; and when either sulphuric or nitric acid is contaminated with any hydrochloric acid, even though in very small proportions, they rapidly corrode aluminum, the hydrochloric acid forming chloride of aluminum, which in turn is converted into sulphate or nitrate, the hydrochloric acid being again set free in a nascent state to again attack the aluminum, and in this way the corroding chloride acts as a carrier for the sulphuric or nitric acid.

Aluminum is unacted upon by sulphureted hydrogen, carbonic oxide or carbonic acid gases, or by sulphurus acid or other sulphur vapors. These facts add much to the value of aluminum for many purposes where the tarnishing of silver is a serious inconvenience. It is also practically unaffected by common salt, either wet or dry, or by sea water, or by weak solutions of salt in acetic acid. A piece of aluminum $3\frac{3}{8} \times 1\frac{1}{2} \times \frac{7}{32}$ inches was immersed for 23 days in a 3 per cent solution of common table salt, at a temperature of 80° F. The strip lost 0.025 gram in weight; 4.27 square inches were exposed; this would give a loss by corrosion per square inch per week of 0.00178 gram. A similar strip was immersed for a similar length of time, under like conditions, in a solution of 3 per cent. common salt, with 2 per cent. of No. 8 acetic acid. The action in this case was not confined to that portion immersed in the liquid, but a crust of basic salts was also formed on the portion of the plate above the liquid. The strip was frequently reversed end for end in order to equalize the action. This piece lost 0.165 gram upon an area of 6.4 inches, and the loss was at the rate of 0.00785 gram per square inch per week.

These solutions were chosen as fairly representing extreme conditions to which aluminum would be subjected for domestic culinary operations. This corrosion is very slight and of no practical consequence, being much less than tin plate or silver plate would suffer under similar circumstances. Solutions of the caustic alkalies readily attack aluminum. In ammonia, aluminum is turned gray in color, but does not lose weight or strength. Chlorine, bromine, iodine and fluorine attack aluminum and corrode it.

Aluminum is unacted upon by organic secretions, such as sweat, saliva or the like, and the metal is finding considerable uses by dentists in the metal plates upon which to back false teeth, as well as by surgeons in traecheometer tubes, &c. For these purposes the aluminum should be free from iron, as it is found that where iron is present in the aluminum the metal is acted upon by the saliva.

Mechanical Properties.—Aluminum is naturally a very soft metal. Castings of aluminum, made a little larger than the finished object desired and drop-forged in dies, will very considerably harden the metal, and add to its rigidity, by this means, for many bearings where great weight does not have to be sustained. For bearings of surveying instruments the metal hardened in this way answers very satisfactorily. Wire and sheets of aluminum can be left in this hardened state, having the hardness of brass and with a good deal of elasticity and spring in them The Eureka Tempered Copper Company, North East, Pa., have succeeded in hardening castings of aluminum in the same way they have hardened copper.

Pure aluminum is one of the most ductile and malleable of metals, and can be drawn into the finest wire and rolled to sheets of $\frac{1}{10000}$ inch thickness. It can also be hammered into foil as thin as gold leaf. The relative malleability of aluminum as shown by its capacity to beat out well into thin foil is one of the best tests of the purity of the metal. The less percentage of silicon and iron in the metal the better and more readily it works up under the beater's hammer. Metal of more than 1 per cent. of impurity will not beat out well into foil. Pure aluminum is absolutely non-para-magnetic; the same remark practically applies to aluminum with 0.05 per cent. iron in its composition. A wire of the average lot of 98.52 per cent. aluminum, suspended by a nearly torsional chord, exhibited no appreciable polarity. An ingot of aluminum, containing 0 15 per cent. iron, showed a very faint trace of polarity; with 2 per cent. iron, the polarity was distinct and very decidedly marked.

All commercially pure aluminum sold by the Pittsburgh Reduction Company contains less than 0.20 per cent. iron, much of it running as low as 0.04 per cent. iron. For this reason aluminum will answer very well for compass boxes or cases for electrical apparatus, where non-magnetic properties are desirable. There are very few commercial metals not chemically pure containing as little iron as does aluminum; certainly all of the brasses, bronzes or German silvers contain a larger percentage of iron. The tensile crushing and transverse tests of aluminum vary very considerably with the varying conditions of hardness, due to cold working; also by the amount of work that has been put upon the metal, the character of the section, &c. The flow of aluminum under tensile tests is very local; the percentage of elongation reducing very rapidly as it is calculated in increasing length from point of fracture.

From tabulated results as averages, we submit the following table of what we believe will be found to be average tensile and compression tests of commercially pure aluminum of composition, varying in each constituent, as follows:

Aluminum, from 97% to 99%.
Silicon, graphitic, from 0.10% to 1 00%.
Silicon, combined, from 0.90% to 2.80%.
Iron, from 0.04% to 0.20%.

	Lbs.
Elastic limit per square inch in tension, castings.....	6,500
Elastic limit per square inch in tension, sheet	12,000
Elastic limit per square inch in tension, wire.....	16,000
Elastic limit per square inch in tension, bars.....	14,000
Ultimate strength per square inch in tension, castings...	15,000
Ultimate strength per square inch in tension, sheet...	24,000
Ultimate strength per square inch in tension, wire....	30,000
Ultimate strength per square inch in tension, bars.....	28,000
Percentage of reduction of area in tension, castings.....	15%
Percentage of reduction of area in tension, sheet..	35%
Percentage of reduction of area in tension, wire	60

Percentage of reduction of area in tension, bars	40%
Elastic limit per square inch under compression in cylinders with length twice the diameter	3,500 lbs.
Ultimate strength per square inch under compression in cylinders with length twice the diameter	13,000 lbs.

Taking the tensile strength of aluminum in relation to its weight it is as strong as steel of 80,000 pounds per square inch. Comparative results in this way are tabulated below as taken from Richards' work on "Aluminum":

	Weight of 1 cubic foot in pounds.	Tensile strength per sq. in.	Length of a bar able to support its weight in feet.
Cast iron	444	16,500	535
Ordinary bronze	525	36,000	9,893
Wrought iron	480	50,000	15,000
Hard structural steel	490	78,000	23,040
Aluminum	168	26,000	23,040

Aluminum when pure is a very sonorous metal; bars of it suspended by fine wire, when struck, give a fine clear bell-like sound. The proper shapes for bells have not yet been devised, as bells of ordinary shapes do not give as good sound as do ingots of the metal.

Conductivity and Electro-Positiveness.—In the electro-chemical series, aluminum is ordinarily placed near the positive end, being under most circumstances more positive than almost all the other metals, and only less positive than the metals of the alkalies and alkaline earths. That is, in most separations of aluminum by electrolysis it is charged with positive electricity and separates out the negative pole. This arrangement, however, is only approximate. Under some circumstances aluminum is electro-positive to sodium, as it reduces sodium when treated with its oxide or carbonate; again, it is electro-negative to iron, as iron reduces aluminum from its sulphide.

The attraction of aluminum for oxygen is only exceeded by that of very few elements. If this attraction be measured by the amount of heat developed in the combination of aluminum and oxygen, it is about three times that of carbon for oxygen, as the amounts of heats produced by equivalents of aluminum and carbon in combining with oxygen, approximately as three to one (CO_2), giving 96,000 units of heat. $Al_2 O_3$ giving 388,000 units of heat. C=1 equivalent carbon Al=1½ equivalents oxygen. The powerful attraction of aluminum for oxygen is turned to practical account in the use of aluminum to remove oxygen from molten steel.

In its behavior with most chemical reagents at ordinary temperatures aluminum resembles platinum and gold. It is like carbon and silicon, which are highly electro-positive at high temperatures, but electro-negative at low. Under some circumstances, as in nitric acid, aluminum is as electro-negative as platinum. It is suggested that at low temperatures the atoms of aluminum are combined with each other so as to render the metal inert. If its full chemical affinities were exhibited at low temperatures, it would be as easily oxidized by acid and water as metallic sodium.

C. K. McGee, of the University of Michigan, has determined the electrical resistance of specimens of aluminum of the "average lot 98.52 per cent." metal with the following results:

Specimen used.	Diam'ter in inch.	Resist'ce in "legal ohms" of 1 yd. At 14° C. = 57° F.	At 76° C. = 170° F.
Unannealed aluminum wire	0.0325	0.05749	0.07202
Annealed al. wire	0.0325	0.05484	0.06928
Pure copper wire has the following resistance:	0.0325	0.0315	0.0387

We find the thermal conductivity is very nearly inversely as its electrical resistance, for unannealed aluminum wire at 14° C. has a conductivity of 17, where copper has the thermal conductivity of 32, the rates being as 1 is to 1.88. Confirmatory accurate determinations are now being made at the University of Michigan by Prof. Carhart, which we hope to embody in the final revision of the text of this paper.

Action of Impurities.—Silicon hardens aluminum considerably, increases its tensile strength without materially decreasing its ductility; it, however, very materially decreases its malleability and takes away its capacity of taking a fine polish, and much more, prevents its retaining whatever polish it has received. Silicon in aluminum oxidizes by action of the atmosphere or of moisture, and if present in proportions of over 3 per cent. very soon coats the metal with a dull gray and unsightly tarnish.

For some purposes, where a harder surface is required than is given by pure aluminum, and where advantages would be taken of the lightness of the metal, and where the surface can be lacquered or otherwise coated to protect it from oxidation, the alloy, say 6 to 8 per cent. of silicon, which can readily be made, can be used with advantage, but in all ordinary work to which aluminum is placed the purer the metal from silicon the better. These remarks apply to the ordinary ways in which we find silicon, a large portion of which exists in the graphitoidal form. Whether the influence of the amorphous silicon, could it be placed in the metal alone free of graphitoidal silicon, would give the advantageous hardness without the tarnishing qualities is an interesting question not yet ascertained.

Iron in small percentages as an impurity of aluminum hardens it, but, of course, adds to its specific gravity and renders it magnetic. It also decreases the malleability of the metal, and, like silicon, detracts from the capacity of the metal to take a fine polish or to retain whatever polish it is at first susceptible of, although the alloy does not tarnish as rapidly as does the siliconized metal. For some purposes where a harder and stouter alloy is wanted a proportion of from 6 to 10 parts of iron works advantageously.

W. J. Keep has pointed out the curious fact that the alloy of 50 per cent. iron and 50 per cent. aluminum, although melted together and seemingly forming a true alloy in the pot and in the metal as first cast, seems to entirely lose its power of cohesion and crumbles down to a powder in the course of a little while, each grain of this powder seeming to contain equal parts of aluminum and iron.

Copper sometimes becomes an accidental impurity of commercially pure aluminum in proportions up to perhaps one-half per cent.; in such small percentages its influence is hardly noticeable in any of the properties of the metal, so far as has come to our notice. In larger proportions, up to 10 per cent. of copper with the aluminum, the metal can readily and advantageously be alloyed, especially for casting where hardness of surface is required. It takes away the peculiar polish of aluminum and the fine gloss and peculiar color of cast aluminum; at the same time, it adds hardness and decreases the shrinkage of castings, and for many purposes can be used advantageously. It has the disadvantage of adding materially to the specific gravity of the metal.

Carbon only unites with aluminum under very high and continued heat, and then only in proportions not exceeding 3 per cent. Wherever it is found associated with aluminum the metal is brittle and porous and friable. Both Deville and Fremy say that under ordinary temperatures aluminum and sulphur do not unite or act on each other; indeed, Deville says aluminum may be heated in a glass tube to a red heat, in vapor of sulphur, without altering the metal. However, at very high temperatures aluminum and sulphur do combine to form a sulphide of composition of $Al_2 S_3$. Ordinary aluminum of commerce is entirely free from sulphur.

Lead is found as an accidental impurity of aluminum in proportions up to ¼ of 1 per cent. In small proportions, so far as yet determined, it has no appreciable action upon the properties of aluminum. In larger proportions lead does not alloy with aluminum, and no homogeneous alloy or even mixture of the two metals, can easily be obtained. Antimony does not unite with aluminum to form any homogeneous alloy. Chromium unites with aluminum readily, hardening it and adding to its tensile strength. An addition of 1 or 2 per cent. of chromium to aluminum improves it for many purposes, although, as in the case of all other impurities, it decreases the malleability of the aluminum. Tungsten unites with aluminum, hardening the metal, but not giving any very useful alloys. Platinum unites with aluminum readily. It, however, does not seem to give any advantageous alloys. They are brittle and unsound.

Tissier says that silver seems to be the metal most useful to improve aluminum, 5 per cent. of silver giving to aluminum increased elasticity and hardness without injuring the malleability of the metal. The alloy is susceptible of taking a very fine polish. The silver lowers the melting point of the aluminum considerably. We predict that the alloys of silver and aluminum will have a large use in the arts in the future. No very valuable alloys of tin and aluminum have been discovered; the tin added to aluminum makes it more brittle and does not seem to give any valuable properties in return. However, small proportions, up to 2 per cent., of aluminum added to tin renders the tin harder and more elastic without decreasing materially its malleability. Cadmium unites readily with aluminum, giving fusible alloys, which are quite malleable; however, does not seem to impart strength, but rather weakness, to aluminum. Bismuth unites with aluminum to form brittle, but very fusible, alloys.

Nickel unites with aluminum to form very brittle alloys in any large proportions; in small percentages, up to 3 per cent. of nickel, its influence is to harden aluminum without seriously decreasing the malleability or ductility of the metal.

An alloy of 70 per cent. of copper, 23 per cent. nickel and 7 per cent. aluminum has a fine yellow color and takes a high polish.

Zinc forms alloys readily with aluminum, which are very brittle and highly crystalline.

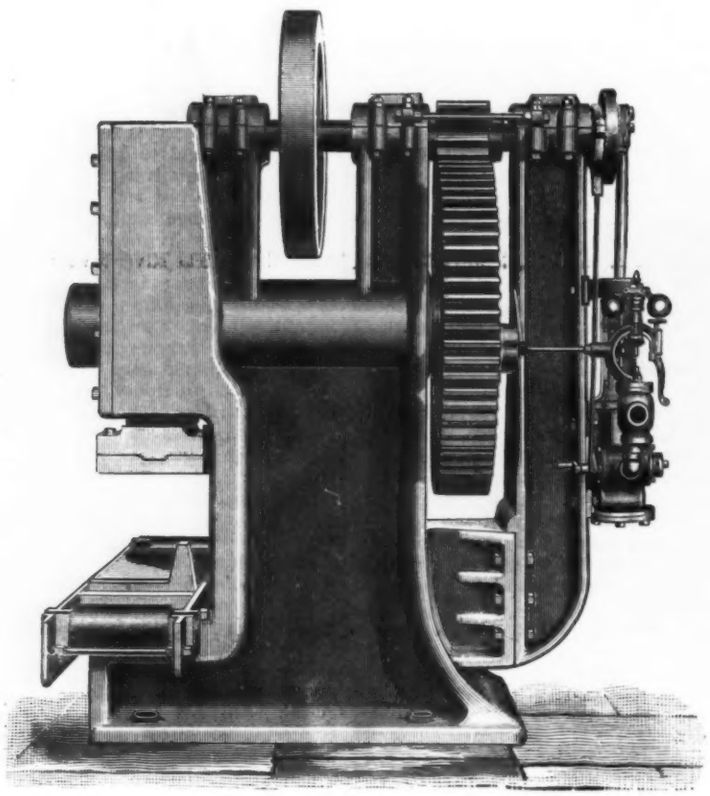
The best solder yet obtained for aluminum is this alloy of zinc, with it using Venetian turpentine as a flux. Unfortunately it will not flow well, nor are the soldered surfaces capable of withstanding hard usage.

Assistant Secretary Tichenor has decided that certain steel wire coated with tin is properly dutiable under the first proviso of T. I., 182, for iron or steel wire "covered with cotton, silk or other materials."

The ordnance officers in the War Department, in making their calculations for the 16-inch guns to be built for coast defense fortifications, hope to overcome the defects developed in such guns built abroad. In most of the guns of this caliber thus far built cracks have appeared between the jackets and hoops after the first few rounds have been fired. This is believed to be the result of errors in calculating the force of the explosion and the elastic limits of the metal.

Rail-Straightening Press.

We illustrate herewith one of the rail-straightening presses used by the Johnson Company, of Johnstown, Pa., for straightening their steel street rails. This press, with the exception of the driving engine, was designed by William Tod & Co. to meet the views of the late Capt. W. R. Jones for the new rail-mill of the Edgar Thomson Steel Works. The presses at the Edgar Thomson Works and at the Homestead Works are all driven by belt. Four of them now in use by the Johnson Company, and two more under construction for them by William Tod & Co., are driven by independent engines attached to the frame of the press, as shown in the cut. The shafts are of steel, the pinion being forged on the driving shaft and cut out of the solid. The frame is very strong, to accommodate the heaviest sections of this class of work.



RAIL-STRAIGHTENING PRESS.

The cut shows the general construction so clearly that further description is unnecessary.

Virginia Iron Notes.

CIGARETTE MACHINERY.

A large industry promises to be built up in this State in the manufacture of the intricate and costly machines that make cigarettes. It requires delicate artisanship and the very best material. For a long time the Bonsack Cigarette Machine held sole and undisputed possession of the field. This remarkably complicated piece of mechanism was constructed and subsequently patented by a young mechanic scarcely beyond his majority, but with a thorough familiarity with what was needed in an apparatus for making cigarettes, and having a pronounced genius for invention, young Mr. Bonsack, after years of experimentation, perfected his machine and put it into practical use. It revolutionized the cigarette business and brought one or two concerns into almost instant prosperity and colossal maguitude. The young inventor has made many times a fortune, and will continue to reap a financial harvest the rest of his life. On the 18th inst. at Lynchburg the Bonsack Machine Company held a meeting at which was developed the fact that the recently incorporated American Tobacco Company had just signed a contract with the Bonsack people for 100 machines, from which the little company are to receive an annual revenue of $250,000, and if additional machines are wanted $2500 is to be paid per year for each machine. The contract covers a period of three years. At the Lynchburg meeting the policy was outlined to buy all new machines that are invented, and requiring that all inventions made by the comapny's employees belong not to the employee, but to the company.

There are several new machines recently patented that propose to contest with the Bonsack for supremacy. E. T. Pollard, of Richmond, who was with the Bonsack company for several years, has invented a cigarette machine, or rather an improvement over the machine in use. He claims that he had no such agreement with the company, and he had therefore obtained a patent on his invention. This in turn may become the nucleus of a new company. The Allison Machine Company is another corporate body making cigarette machines. The Bonsack Company have offered $30,000 worth of Bonsack stock for their machine. The offer, however, has been declined. There is yet another company to be absorbed. Only a few days ago there was organized at Roanoke the International Cigarette Machine Company, with a capital stock of not less than $200,000 and not more than $5,000,000. The following officers and directors were elected: R. H. Woodrum, president; M. M. Rogers, vice-president; J. W. Coon, secretary and treasurer; A. S. Asberry, M. A. Riffe, Col. Joseph H. Sands, C. O'Leary, Wm. F. Baker, B. F. Nininger, M. C. Thomas, R. H. Woodrum and M. M. Rogers, directors. If the four companies remain in the field, as at present seems likely, Virginia will become the seat of an important industry.

Last Thursday, the 20th, was an eventful day in Lynchburg, industrially speaking. Two large iron and coal companies were organized to operate in Southwest Virginia. Charter had already been granted by the Legislature, and each corporation will have a minimum capital of $100,000, with a limit of $2,000,000. The first company formed was the Round Mountain Mining Company, and was organized by Col A. S. Buford, Richmond; J. Wilcox Brown, Baltimore; R. A. Lancaster, New York; C. G. Holland, J. D. Blair and W. N. Ruffin, Danville, and W. E. Perry, Horman B. Newberry and H. C. Alderson, of Tazewell County. Their object is to develop iron lands in the Round Mountain section of Bland and Tazewell counties, where they have recently purchased 30,000 acres of fine iron lands.

The second company formed is the Coal Mountain Mining Company, who own a tract of 20,000 acres of coal lands in Tazewell County, lying on the Clinch Valley Division of the Norfolk and Western. The incorporators are A. J. May, George W. Gilespie, W. E. Perry and Horman Newberry, of Tazewell County; C. G. Holland, M. P. Jordan, E. F. Acree, J. G. Friend, W. N. Ruffin and J. F. Risor, of Danville; A. S. Buford, of Richmond; J. Wilcox Brown, of Baltimore; J. Turner Morehead, Leaksville, N. C.; D. W. C. Benbow, Greensboro, N. C.; J. C. Currie, Wilmington, N. C., and R. A. Lancaster. The properties of both companies will be developed at once.

The Bristol Steel and Iron Company are to build three iron furnaces, each with a daily capacity of 100 tons. The contract has been let to James P. Witherow & Co., of Pittsburgh, and work is to begin at once.

A bill has been introduced in the Virginia Legislature incorporating the Lynchburg and Southwest Virginia Development Company, with a capital stock of not less than $100,000 nor more than $1,000,000. Developing valuable iron properties will constitute one of the most important parts of the company's business. The incorporators are United States Senator John W. Daniel, Major J. D. Patton, Messrs. Charles E. Belvin, A. Monteiro, LeRoy E. Brown, N. T. Pate, of Richmond; Hon. E. L. Roberts, Smyth County; Hon. E. S. Kendrick, Bristol; Messrs. W. C. Craig, Augusta County; J. F. Slaughter, J. H. Bartlett, T. D. Evans, A. B. Barker, C. K. Mowman, W. H. Wren, of Lynchburg.

The Legislature has also incorporated the Clinch River Mineral Company, the Locust Cove Gypsum Mining and Mfg. Company, the Appalachian Steel and Iron Company, the Fluvanna Mining and Milling Company, the Washington Zinc Company, of Lynchburg, the Peak Knob Iron Company, the Bedford Industrial and Development Company, the R. W. Coffer Machine Company, the Old Dominion Construction Company, the Brosiur and Bedford City Steel and Iron Mfg. Company, and the Pulaski Development Company. The Legislature has also been appealed to to change the name of the Stock Creek Coal and Iron Company to the Virginia, Tennessee and Carolina Company, and to authorize them to increase their capital stock.

At Roanoke there is gratifying industrial activity and many rumors of new manufacturing plants to be early established. The trade prospects in all of the iron working concerns have never been brighter. The Rolling Stock Company are so far behind their orders that during the past week they have been compelled to begin working double time. Last week the Roanoke Machine Works paid off their employees in the various departments, and

the pay-roll, $56,000, was greater than it has ever been at any previous pay-day.

During the past week the Roanoke Patent Investment Company were organized with a paid-up capital of $250,000. This concern will stimulate inventive genius in Virginia and will develop new inventions that are meritorious. The following are the incorporators: Geo. H. Moore, of Minneapolis; Fred. H. Brown, of Washington, president; L. L. Powell, vice-president; C. B. Hoffman, D. R. Bowman, L. L. Powell, A. J. Tubbs, directors. There is talk of a large pipe works being established.

At Salem, which is a close neighborhood to Roanoke, work on the new iron furnace is steadily progressing, nearly all of the necessary machinery having been received.

At Danville a large foundry is being erected for a concern from Durham, N. C., which town is threatened with serious losses to both population and industries by overbooming and too much "inflated" transactions on paper. At the first sound of alarm the Durham concern sought elsewhere for a location, and settled at Danville, where there is much commercial and industrial prosperity, public spirit and business breadth. The new foundry is expected to begin operations next week, and will start off with a good business that has accumulated since the transfer of their plant from Durham.

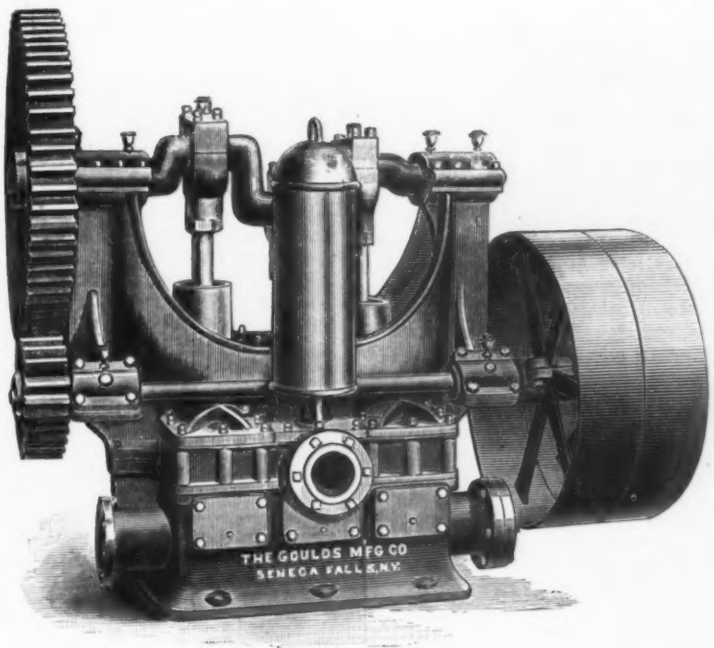
There is to be built a furnace at Big Stone Gap, and at the Black Rock iron mines additional machinery is now being put in that will increase the daily output to 100 tons of ore.

At Pulaski City there is wonderful activity in furnace building. It is stated that Roanoke and Pulaski Mineral Company will build a furnace; the Lake Spring Land and Improvement Company are also figuring on a furnace, and it is stated that there are two additional companies forming for the erection of two more furnaces.

The development of the beet sugar industry in France has made wonderful strides within the past three years, and according to the latest indications the crop of 1889–90 will result in a yield of not less than 750,000 tons raw sugar. This is very nearly double the quantity produced in 1887–88, which was 392,000 tons, and makes France the second largest producer in Europe. The yield of beet sugar in Europe promises this year to exceed the cane product of the world by more than 1,000,000 tons.

Triplex Suction and Force Pump.

The triplex suction and force pump we herewith illustrate is made by the Goulds Mfg Company, of Seneca Falls, N. Y., of two kinds—one with outside packed plungers, with or without, as desired, gearing for high-pressure service, and the other with inside packed plungers for low-pressure service. Both styles have hand holes for easy access to all valves, which are of hard rubber with spiral springs similar to steam pump valves, with composition grid seats. The high-pressure plungers move through carefully fitted glands and will pump either hot or cold water, no matter how dirty; the low pressure plungers have hydraulic cup leather packings fitted to each cylinder.



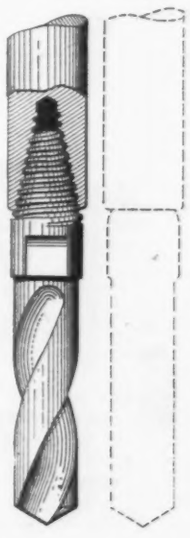
TRIPLEX SUCTION AND FORCE PUMP.

The main casting consists of three heavy cast iron cylinders, truly bored, and formed with outwardly extending supporting arms for the crank-shaft, which is of steel and has journals 120° apart, to which the plunger rods are connected. Suction can be obtained at either end of the bed plate, the discharge being from the side or top of the air chamber. Since in this combination one cylinder will be always taking and delivering water, there are no points of uneven resistance and no break in the flow of water, and consequently no unequal exertion of power. The many applications of a pump of this character are evident.

The Ferracute Machine Company, of Bridgeton, N. J., have just celebrated the making of their 2000th press, which happened to be the largest cutting press ever built by them, and which weighed 12,000 pounds. This event was celebrated by a banquet held at the works, and at which both the officers and employees of the company had a most enjoyable time. President Oberlin Smith delivered an address happily in keeping with the occasion, in which he gave an outline of the history of the concern, and which he appropriately closed by announcing that orders had been received since January 1 which far exceeded any other period in the firm's existence. We are favored with so-called "wipers," which we translate to mean Japanese napkins, which were used instead of "waste," and which bear the imprint of the "First Baby, born April 23, 1864, weight 500 lbs.," and of the "2000th Baby, born February 18, 1890, weight, 12,000 lbs." We trust that following additions to the family may show a like growth.

Drill.

The drill of which we present a drawing has been patented by Francis H. Richards, of Hartford, Conn. and assigned to Eckley B. Coxe, of Drifton, Pa. It is



Drill for Multiple-Drilling Machines.

intended for use in multiple drilling machines, the object being to furnish a drill which can be securely affixed to a drill-spindle that is little if any larger than the drill itself, so that the drills may be used for drilling holes in close proximity to each other. The drill shank is formed tapering, and the tapered portion is threaded to fit a corresponding thread formed within the conically-bored end of the spindle. The shank of the drill below the spindle is flattened in order that the drill may be removed by means of a wrench. This method of holding the drill permits of the reduction of the diameter of the spindle almost or quite to that of the drill.

We are requested to state that the annealing pin described and illustrated in *The Iron Age*, page 293, invented by C. E. Matteson, of Allentown, and in use at the works of the Iowa Barb Wire Company, is patented

The Board of Electrical Control decided to allow the Consolidated Telegraph and Electrical Subway Company to transfer their electric light and power subways to a corporation known as the Standard Electrical Subway Company. It further decided to make with this latter corporation a contract for the construction of the subways needed to complete the system. The Standard Company seems to have been brought into existence merely to accept the contract and thereafter to transfer all the rights and franchises to the Electric Light and Power Company, the name given to the consolidated Westinghouse interests in this city. The contract was made the basis of an issue of $1,500,000 of stock, but the scheme was spoiled by an injunction.

Notes on Fuel Gas.*

BY GEORGE W. GOETZ, MILWAUKEE, WIS.

As is well known, the general use of natural gas in Pittsburgh and vicinity for domestic and industrial purposes has shown the great advantages and benefits to be derived by the use of a gaseous fuel. In order to ascertain and bring together all the facts relating to a large and economical production, purification, distribution and consumption of fuel gas made out of coal, the Fuel Gas and Electric Engineering Company, Limited, was organized under the presidency of George Westinghouse, Jr.

Interviews with leading authorities, in this country and in Europe, and a careful perusal of the enormous literature on this subject, brought out so many conflicting statements as to show the necessity of experiments, on a large and practical scale, to get accurate data to base ideas upon, and to ascertain the practical difficulties and merits of the respective processes proposed. A large number of experiments were made as to the possibilities of water gas, illuminating gas, producer gas and oil gas as fuels. A bench of retorts, producers, water-gas apparatus, condensers, scrubbers, meters, a laboratory, and a holder, with a capacity of 50,000 cubic feet, being at disposal, it was possible to test the properties of the different gases obtained and to make mixtures of them in any desired proportion. All these experiments were controlled by carefully-made gas analyses.

Interesting experiments on the diffusion of gases in a large holder when two gases of different specific gravity enter the holder alternately or at the same time were also made, as well as a large number of tests on the combustion of different gases. Mr. Frederick Siemens' statements on luminous flames and on heating by radiation were fully corroborated by carefully-made tests; and gas-burning devices, based on the radiation of heat from luminous flames, were developed which will give an efficiency of 84 per cent. of the original heat-units in the gas, 54 per cent. of which results in radiant heat and is reflected on the floors of a room. Producer gas is undoubtedly the cheapest fuel gas that can be made, and answers all purposes where the air necessary for its combustion can be heated by the off-going heat of the furnace. Tests have shown, however, that producer gas carries too much nitrogen to permit its distribution to a community, since, in consequence of the presence of this constituent, its calorific power is too low, and its flame extinguishes so easily as to be dangerous for household use. It was important to know how many cubic feet of producer gas 1 ton of coal will give. Conflicting statements as to this point will be found in the literature of the subject, the figures ranging from 150,000 to 250,000 cubic feet per ton. To get at the actual figures by a practical test a ten days' run, night and day, was made. Pittsburgh coal of the following average composition was used :

	Per cent.
Water	1.26
Volatile matter	36.22
Fixed carbon	57.98
Sulphur	0.70
Ash	3.78

In order to get a gas very low in carbonic acid, a much larger depth of fuel than is generally carried in producers was required; and, as it is impossible to poke by hand such a deep fire, a pneumatic rammer was placed upon the producer. This rammer consists of a cast-iron ring so constructed that it will not only exert a pressure upon the coal, but also force the coal to the periphery of the producer—which is desired, because the gas has a tendency to creep up along the walls. The ring is raised by air-pressure and allowed to fall upon the fuel, the stroke given depending upon the blow desired to make the fuel sink regularly.

A producer of the above type can burn from 12 to 15 tons of coal in 24 hours. A positive air-blast is used, and steam is admitted under the grate, the admission of both being controlled by valves at the top of the producer. The result of a ten days' run, carefully metered, showed that 1 ton of Pittsburgh coal will give, on an average, 131,280 cubic feet of purified producer gas, corrected for barometer and temperature. The gas from the producer passed through scrubbers, condensers and meters, and thence into a holder of 50,000 cubic feet capacity. The carbonic acid in the gas was at times as low as 1.4 per cent., but the average percentage was about 3.4 per cent., at a pressure of 4 inches of water. With a pressure as low as is generally carried on producers in connection with steel-melting furnaces the carbonic acid could have been easily kept at 1 per cent. with such a deep body of fire in the producer. The average composition of the gas was:

CO_2	3.4
CH_4	3.1
H	9.2
C_2H_4	0.8
CO	25.3

The remainder was mainly nitrogen. This experimental determination of the amount of producer gas obtainable from 1 ton of Pittsburgh coal, will enable engineers to judge what they are likely to get from other coals. An interesting fact as to the heat-units required to puddle 1 gross ton of pig iron was determined by the engineers of the above company. The experimental gas furnace employed, with regenerators for air only, was designed and superintended by W. F. Zimmermann.

The ordinary single-handed puddling furnaces used in Pittsburgh consume about 36,000,000 British heat-units per gross ton of pig iron, whereas when gas is employed about 14,000,000 heat-units will do the same work. It was found that 13,250 cubic feet of natural gas, with 1,100,000 heat-units per 1000 cubic feet, will puddle one gross ton of pig iron, whereas by using a gas with nearly 300,000 heat-units per 1000 cubic feet 47,000 cubic feet were consumed, and by using a gas with 266,000 heat-units 54,000 cubic feet were used to puddle 1 gross ton of pig iron. The number of cubic feet of gas consumed, multiplied by the respective heat-units in 1000 cubic feet, will, in each instance, give somewhat above 14,000,000 heat units.

These results clearly show that if all circumstances as to the production and consumption of heat could have been considered in these experiments the amount of gas used in each case would have been exactly inversely proportional to the heat-units contained in the gas. This result could, of course, be expected from the laws of heat, but it is, nevertheless, an interesting fact to have it experimentally demonstrated on a large scale. This result on puddling, and similar results on the consumption of different gases to evaporate water, combined with many other considerations, has led to the important conclusion that it is not advisable to distribute a gas for domestic use with a comparatively low amount of heat-units per 1000 cubic feet. The higher the heat-units per 1000 cubic feet the better, especially when the gas is to be widely distributed.

*Presented at the Washington Meeting of the American Institute of Mining Engineers.

A shipment of a cargo of mummified cats from Egypt was sold at auction in Liverpool for fertilizing purposes.

Aluminum Bronze and Brass as a Suitable Material for Propellers.*

BY EUGENE H. COWLES, LOCKPORT, N. Y.

The material for the screws of modern steamships has been frequently changed. In the beginning they were made of cast iron; succeeding this came the famous gun metal or tin bronze, in England a composition of 86 to 88 per cent. of copper, from 2 to 5 per cent. of zinc and from 8 to 12 per cent. of tin, while the American standard gun bronze is composed of 10 per cent. of tin, 2 per cent. of zinc and 88 per cent. of copper. Following these materials came forged steel blades and phosphor bronze. Succeeding the last two simultaneously occurred the use of propellers of mild steel cast in sand and manganese bronze, so-called, but in reality a Muntz metal, with a composition of from 40 to 45 per cent. of zinc and from 60 to 65 per cent. of copper, with about as much zinc as would burn off in the melting replaced with a small percentage of ferromanganese. Following these came wheels made from Dick's Delta metal, a metal similar to manganese bronze, but with iron used instead of ferromanganese. Last on the list appears Cowle's aluminum brass and aluminum bronze.

Cast iron, upon experience, has proved too weak and corrodible for use in fast ships, its average life, according to W. C. Wallace, being five to six years. Yet it is agreed by eminent English authorities that cast iron resists corrosion better than steel. Another and still worse characteristic of cast iron is utter lack of durability and inability to withstand a shock used in thin masses. Gun bronze upon being substituted for cast iron successfully overcame the objection raised on account of the corrosion of the wheel. But it was found that this same obstacle came up in a new shape; that the bronze wheel when operated on a steel or iron ship constituted a galvanic couple. The action set up caused a serious pitting and corrosion of the iron plates in the stern of the ship. This was happily overcome by the attachment of plates of zinc around the inside of the aperture in which the propeller works.

Another marked improvement made in substituting gun bronze for cast iron was in the matter of speed. The old gun material in its time and place did good work. The tensile strength of gun bronze varies from 6 to 10 tons in actual practice. The writer has cut bars from bits of solid wheels furnished by our Navy Department and the best results obtained from these were from 5 to 9 tons tensile strength, yet at the same time he has seen specially prepared cast bars run as high as 25 tons in tensile strength and with 20 per cent. of ductility. English authorities claim for it 12 to 16 tons tensile strength and from 1 to 5 per cent. of ductility. These results are probably on small bars 2 inches in diameter and 15 inches between marks. Chief Engineer Harris, of the United States Navy, obtained a strength of but 10 to 12 tons per square inch and 3¼ per cent. ductility.

To secure greater strength and stiffness the English shipbuilders next tried Farquhar cast steel and many of this nature are now in use. In these there is plenty of strength and toughness, but the question of corrosion reappears and is a most serious one. Phosphor bronze was found to be little if any better than the gun bronze in the matter of strength, although, of course, sufficiently uncorrodible. Its much higher price precluded an extensive use of it for propellers. Delta metal, like phosphor bronze and manganese bronze, came into a very limited use in the effort to secure a strong and yet non-corrodible material. So-called man-

*Presented at the Washington meeting of the American Institute of Mining Engineers.

ganese bronze is in reality a manganese brass, for zinc instead of tin is the chief element added to the copper. What its real strength and ductility is few if any people know. P. M. Parsons, the proprietor of this brand of metal, claims for it in *Engineering*, in a controversy with the writer, a tensile strength of from 24 to 28 tons on small bars when cast in sand. He also claimed for it a transverse strength of 2 long tons on a bar 1 inch square by 12 inches. W. C. Wallace states that brass foundries of high repute in England will only admit that manganese bronze has from 12 to 17 tons tensile strength. Horace See, until recently with Cramps, stated lately in the New York *Times* that he had privately tested the metal used in the United States steamer Yorktown, and that it developed a registered tensile strength of 45,000 pounds per square inch and from 6 to 12 per cent. elongation. He did not state the dimensions of the bars nor how the same were made, two all-important considerations.

Cramp & Co. claim for the metal a strength of from 45,000 to 60,000 pounds, and I do not doubt but that such results have occasionally been attained on very small bars cast under the most favorable conditions, precisely as similar and equally high results have been attained in the old gun bronze. The writer's experience with it in the testing machine is that it is a material about one-quarter stronger than the old gun bronze, and I should be much surprised to see it exhibit a greater tensile strength than 30,000 pounds in a bar 2 inches in diameter and 15 inches between marks. So far as non-corrodibility and casting qualities are concerned manganese bronze is all that the gun bronze was. It is extensively and successfully used.

Aluminum bronze is the strongest of all the copper alloys. A small bar of it cast in sand broke in the testing machine of the Leeds Forge Company, at Leeds, England, in the presence of Sampson Fox, at the unheard-of load of 130,000 pounds per square inch and with about 0.5 per cent. elongation in 1 inch. The bronze in question was made at Lockport, N. Y., in the Cowles electric furnace from corundum and had approximately 10 per cent. of aluminum, 10 per cent. of silicon, 0.5 per cent. of iron and 88½ per cent. of copper in its composition. It is what is known as the A1 grade of bronze. Many hundreds of tests on this grade of metal on small bars up to ¾ inch in diameter prove its tensile strength to be over 100,000 pounds on bars of that size, while its transverse strength on our test ran as high as 95,000 pounds on a bar 1 inch by 1 inch by 12 inches. Its elastic limit is proportionately high and its hardness far above all other alloys. Its corrodibility is far less in salt water than manganese or gun bronze.

While a short metal so far as ductility is concerned should not weigh against it, for it is in no sense a brittle metal, it must be properly cast to obtain good results Its price alone is the one great obstacle to its introduction into propellers generally. This is approximately $700 per ton for ingot metal alone.

Aluminum brass is produced by fusing together equal weights of A1 aluminum bronze, copper and zinc. The material is left in the furnace until a small test bar shows a tensile strength of 80,000 pounds or over, with 2 to 3 per cent. elongation. At times tests of this bronze on small bars have shown as high as 100,000 pounds. Three of these, which were attached to a large casting made by the Brush Electric Company, at Cleveland, for the hub of the colossus dynamo in the Cowles Works, at Lockport, exhibited a tensile strength of from 93,000 to 96,000 pounds and 2½ to 7½ per cent. elongation. A bar of it, 2 inches in diameter and 15 inches long, was broken at 82,000 pounds on the Watertown machine, by Chief Engineer Harris, U. S. N. Three tests of this No. 2 brass in England on sand castings gave equally high results. A bar 1 x 6 inches broke at 76,187 pounds, elongation 1½ per cent. Another bar, 2 x 12 inches, broke with a load of 72,912 pounds and 1 per cent. elongation. The last bar was 3 inches in diameter and 18 inches long between marks. It broke at 66,752 pounds and a slight elongation. These three tests were made at the proving house of the Lloyd's, near Netherton. The screw of the United States gunboat Petrel is cast from aluminum brass mixed with a trifle less zinc in order to increase its ductility. Its cost is about the same as that of other alloys.

We have not to-day in this country or in England any official standard by which to judge of the physical characteristics of cast metal. The Harris test bar is 22 inches long, 2½ inches in diameter at the head, 2 inches in diameter in the shank and 15 inches between marks. Two other requirements are absolutely necessary before a fair comparison of different materials can be secured. One is a statement as to whether the same was cast in dry or green sand, or in a chill. The other inquiry is whether it was cast attached to a larger casting or cast by itself. As a rule, the smaller the bar the higher the result, no matter what alloy is under consideration, unless it is perhaps the aluminum brass. Tin bronze and manganese bronze show this to be so much as aluminum bronze. It is also true of all of the ordinary brasses. It has also been found to be true that chill castings give higher results than sand castings, and that bars cast by themselves purposely for testing almost invariably run higher than have those of the same material cast attached to castings. It is also a fact that bars cut from castings are generally weaker than bars cast alone. All tests of bars of cast metals, for a fair comparison, must be made under identically the same conditions in the foundry. When the material is supposed to be the same, or approximately so, a complete analysis of the broken bars should be made.

The new steamship Orizaba, of the New York and Cuba Mail Steamship Company, made a successful trial trip last week from Roach's shipyard, in Chester, to this city. She is the second of the new fleet of three steamers which this company are putting in their Mexican trade. The first of them, the Yumuri, was finished last month. The keel of the third was recently laid and the vessel will be ready next summer. They are three of the finest vessels that have ever been built in America, and will cost about $500,000 apiece.

Very satisfactory progress is being made at the Columbian Iron Works in Baltimore on the construction of the 2000-ton steel cruisers Nos. 9 and 10. The Navy Department has been informed that all the materials for hull and machinery have been ordered, and the keel-plates and other material have already been shipped. The patterns for the stern-posts and for much of the machinery have already been made and are now in the foundry. Another Baltimore establishment that will be in the field as a competitor for naval work is the Pennsylvania Steel Company, who are building a great steel plant at Sparrow Point, just outside of Baltimore. At a recent meeting of the company it was determined to expend $500,000 at once for a steel shipbuilding plant, and a complete shipyard will be operated in connection with the steel works.

The Okonite Insulated Wire Works, employing 500 hands, have just started in the thriving manufacturing town of Passaic, N. J.

PERSONAL.

John Stephenson, the venerable car builder, now 81 years of age, is dangerously ill at his home in New Rochelle, N. Y.

It is rumored that Commodore Sicard, late chief of the Bureau of Ordnance, will resign in a year and become connected with the Midvale Steel Works.

James M. Tower, formerly a member of the Common Council of Providence, has accepted the New England agency of the New Jersey Steel and Iron Company.

Everett Fruzas was elected president of the Sims-Edison Electric Torpedo Company, of this city.

C. N. Parker, of the firm of Parker & Topping, lessees of the Northern Pacific Foundry, at Brainerd, Minn., visited Chicago last week on important business. He states that the prospects in their line for the coming year are most excellent.

Frank R. Blaurock, for many years agent at Chicago for Brown & Co., proprietors of the Wayne Iron and Steel Works, of Pittsburgh, maintaining an office in the Rookery Building, Chicago, has closed his office to enter a wider field. He will hereafter represent the firm among consumers of steel in the Atlantic States, as well as throughout the territory with which he has been exclusively connected.

James E. York, M. E., has opened an office in room 700, Phenix Building, Chicago. Mr. York is a well-known engineer, who has been employed in the erection of a number of the most prominent iron and steel works in the country.

D. I. Bachman, who was formerly connected with the Center Iron Company, and later was superintendent of the wash-ore department at Gatesburgh, Centre County, Pa., has resigned the latter post to go to Roanoke, Va., to take charge of a number of mines in that vicinity. Mr. Bachman will leave for Virginia on the 2d ult., but has not yet determined upon his residence,

The Etna charcoal furnace, at Etna, Ga., is under the management of Alexander Hamilton and Joseph J. Hamilton, who are probably the youngest iron manufacturers in the country. They have since their connection with the furnace changed it from a cold-blast stack making 50 tons a week to a warm-blast furnace producing 175 tons of car-wheel iron per week.

David S. Williams, of the Crane Iron Company, at Catasauqua, Pa., has resigned his position, to take effect on April 1, next. Mr. Williams has been in the employ of the above firm for 23 years.

President Walker, of the Massachusetts Institute of Technology, has just published his annual report. He shows the need of an endowment of $2,000,000 to place the institute on a firm basis, with provisions for paying adequate salaries to the corps of instructors, as well as accommodations for future growth. Thirty-five States of the Union are represented on the list of students; of the total number of 909, 533 are from Massachusetts, or 58.6 per cent. of the whole; 114 are from other New England States, 262 from outside New England, of whom 22 are from foreign countries.

Work is progressing rapidly on the plant of the Chesapeake Dry Dock and Construction Company at Newport News, Va. The amount of money which has been set aside for building the shipyard is $3,000,000. Of this sum $1,500,000 will be devoted to the purchase of machinery.

THE WEEK.

The steel-hulled river steamer City of Kingston made the trip successfully around Cape Horn from New York, arriving at Seattle, Wash. Territory, in 92 days. The consumption of coal averaged 12 tons a day. She will trade on Puget Sound.

A important decision has been rendered by the Supreme Court of Michigan with regard to mechanics' liens. It holds that a lien law under which a property-owner was compelled to make double payment for part of the work on his house is unconstitutional. "One man cannot be made to pay the debts of another," the Court says, "and a lien can properly attach only to the amount which remains unpaid to the contractor."

The New England Land Company, of Egypt, has been organized under the laws of Massachusetts to purchase land in and about Port Said, the Mediterranean port of the Suez Canal, and contemplate the building of a line of railway thence through the Holy Land to Damascus in Arabia Petrea. Among the stockholders are President Frank Jones, of the Boston and Maine Railroad, Governor Goodell, of New Hampshire, Senator Frye and General Butler. The founders of the enterprise are persuaded that Port Said is destined to become the great distributing point of Northern Egypt and the whole country lying at the Eastern end of the Mediterranean.

The Baltimore and Ohio Railroad Company are reported to have changed their tactics in regard to the defunct Chesapeake and Ohio Canal, and now seek to restore navigation rather than have it fall into the hands of competitors.

The Newark street railroads have been purchased by a syndicate of New York and Philadelphia capitalists, the same who already control the "gridiron" system in this city. The new purchase comprises 30 miles of road, and the reported consideration is about $4,000,000.

The new series of postage stamps was issued by the Government on Saturday morning.

T. V. Powderly, the Master Workman, is writing a series of letters descriptive of the hardships endured in Pennsylvania in consequence of the shutting down of coal mines, the scarcity of money and difficulty in getting credit at the stores. Many, he says, are driven to starvation and desperation.

An electric street railway system is about to be introduced into Minneapolis, at a cost of $2,000,000. No such electrical equipment has ever been made.

The precise location of the proposed bridge between Philadelphia and Camden excites a warm discussion among merchants and others interested. General Casey, chief of the Engineering Corps of the United States Army, recommends that the bridge shall be constructed as a high bridge with unbroken and continuous span; shall be 150 feet above mean low water, and only one pier shall be in the river at least 1000 feet from the Pennsylvania shore and 800 feet from the New Jersey shore.

The old salt trading firm of Todd & Co., corner of Old Slip and Front street, in this city, have done business on that spot for 100 years.

The New York State Assessor, James L. Williams, in his annual report shows that there is an increased assessment of real estate over the preceding year of $990,583,117, and an increased assessment of personal property of $7,646,595, making the total for 1889 $4,567,429,757. The assessors say that the personal property in the State liable to taxation is fully equal to the assessed value of the real, while the real pays more than 90 per cent. Thus $2,500,000,000 escapes assessment. In 1889 $159,185,872, or about one-half of the total assessed value of personal property in the State, was invested in new corporations, and since 1886 the capital invested in corporations is nearly $600,000,000, while the bonded indebtedness of the corporations of the State, nearly all of which escapes taxation, is over $2,000,000,000. Thirty nine counties show increases in real estate values and 21 show losses. The assessors says the complaints relative to the equalization of New York County are without foundation; that the sales public and private, made in New York show that the assessment is not more than 50 per cent. of the full value.

The Travelers' Exchange, at Union Square, organized by the principal New York hotel proprietors as a sort of bureau of information concerning all the trunk line railroads, did not receive the sanction of the several railroad managers and so is abandoned, after an expenditure of $50,000 by the projectors.

A favorable report has been made in the Senate on the resolution appropriating $6,200,000 to construct a deep-water harbor at Galveston, Texas.

A. H. Simpson, the contractor for the construction of the new dry-dock at the Navy Yard, League Island, says that the work is progressing rapidly and to his entire satisfaction.

The American Institute has leased the Metropolitan Telephone and Telegraph Building, Nos. 111–115 West Thirty-eighth street, and will occupy the new quarters with its offices and library about April 1.

Plans have been completed for the Williamson Free School of Mechanical Trades, in Philadelphia, and it is expected that the school will open in May, 1891.

The strike against Morton & Chesley, contracting carpenters in this city was successful. The firm will employ union men at union wages, and the delegates of the carpenters' unions have the privilege to enter any building on which the firm is doing work to inspect the union cards of the workmen. All the "scab" carpenters employed on the Wilkes building at Wall and Broad streets were discharged.

Captain Bates, the new Commissioner of Navigation, has prepared for the use of the House Committee on Merchant Marine and Fisheries a statement showing the total amount of bounty that the Government will have to pay should Congressman Farquhar's bill become a law. For the first year Captain Bates estimates the amount of bounty at $3,906,581, divided as follows: To sail ships, $2,056,025; to steamships, $1,906,581. Of this total amount one-eighth, or about $500,000, would be realized by the Treasury from the tonnage tax. Captain Bates does not believe the total amount of bounty will increase very much in the first ten years, owing to the time it will take to establish more ship plants, build vessels and secure the trade for them. At the same time the older vessels will be going to decay. He therefore estimates that the total bounty for any year of the first ten years will not exceed $5,000,000 or $6,000,000.

The Sugar Trust is no longer a monopoly. The advance of about ⅛ cent per pound, which it was enabled to effect about two years ago, can no longer be maintained. To-day consumers are being supplied at prices that are relatively as cheap as they ever were in this country. Take, for instance, the price of granulated on the 1st of last July (9¼ cents) when the trust was in full swing and Mr. Spreckels' Philadelphia refinery was uncompleted, and compare it with the value of centrifugal, 8¼ cents, or a difference of 1 cent per pound; whereas, a few days ago, granulated was 6½ cents, with centrifugal selling at 5,⅝ or a difference of half a cent; and to-day granulated is 6 1/16 and centrifugal 5⅛, or a margin less than three-quarters of a cent. The trust has a productive capacity of 27,750 barrels per diem in New York and Boston, while the present capacity of Mr. Spreckels' refinery is not over 1500 barrels, but it is nevertheless sufficient to take control, so far as prices are concerned, out of the hands of the trust.

The gaslight companies in Buffalo have reduced the price of gas from $1.25 to $1.20 per 1000 feet and the electric light companies have cut down their figures from 42½ cents to 40 cents per lamp.

The World's Fair bill appropriating $10,000,000 was amended so that all the executive and important powers of the commission should be limited by a two-thirds vote. In this shape it was signed by Governor Hill and sent to Washington for the action of Congress. The House voted in favor of Chicago 157, against 107 for New York, 25 for St. Louis and 18 for Washington.

The Carnegie Free Library, in Allegheny City, Pa., was dedicated the 20th inst., and the institution was declared open by President Harrison.

A $7,000,000 mortgage has been executed by the Alley Elevated Railroad Company, of Chicago, to a trust company.

Brunswick, Ga., where a few years ago only a few schooners got occasional cargoes, exported in 1889 goods valued at $8,200,275.

The Boston *Herald* is about to invest $100,000 in two new presses, each capable of producing 48,000 quarto sheets per hour.

The four French engineers commissioned to examine the Panama Canal arrived in this city via San Francisco, but preserved a discreet silence respecting their views of the future of this great undertaking.

Contracts are soon to be awarded for extensive new market buildings in Philadelphia.

Labor organizations in this State desire to place prison labor under severer restrictions than are imposed by the law now in force. A bill introduced in the Senate by Mr. Collins, by request of the labor organizations of the State, provides against the use of motive power machinery for manufacturing purposes in penal institutions, and also that the labor of prisoners shall not be contracted out. It proposes that the prisoners shall manufacture, upon requisition only, such articles only as are commonly needed and used in such institutions. The price shall not exceed the actual cost of the articles so manufactured

Georgia is said to be ahead of all other Southern States in the manufacture of cotton. There are nearly 100 cotton mills in the State, about 70 being in operation at present. The largest plant is that of the Eagle and Phenix Mfg. Company, at Columbus, and has 45,360 spindles and 1488 looms. During the last year all the mills consumed 154,000 bales of cotton.

The spring vegetable trains from Charleston this year started on their regular trips just two months ahead of time.

James A. Simmons, of banking fame, has important contracts from the Government for the improvement of Harlem River, Newtown Creek, Buttermilk Chan-

nel, Gowanus Bay, and Raritan Bay in New Jersey. Much of the work is now in progress.

Standard time has been substituted by banks and business houses in Cincinnati, thus setting the day's work back 22 minutes.

Philadelphia will soon have an abattoir on the Schuylkill River, costing $200,000, exclusive of the ground. Fifty Western cattle growers are among the subscribers.

Authorities in real estate estimate that 15,000 dwellings will be erected in Philadelphia this year, or one-third more than in 1889. It is said that capitalists are turning their attention in this direction because of the low rate of interest in other quarters.

The absence of speculation on the Produce Exchange is even more noticeable than in the stock market, and is variously accounted for. Henry Clews, in an interview, ascribed the decline in the speculation to the June corner of 1887 and the September corner of 1888, particularly the latter. The Hutchinson corner completely broke up the foreign trade, which was heavily short. Foreigners found that they could not protect themselves. Others believe that the depression is due in great part to "bucket shops" in the small cities and country towns. Actual business on the exchange seems to be moving fairly, very little complaint being heard in this direction.

Thick veins of rock salt have been found near Cleveland, Ohio, at a depth of 3000 feet, and in a short time the production will be 5000 barrels of refined salt per day

Three British tramp steamers, which recently met with disaster, now float the American flag, after passing through the hands of the underwriters.

The New York Assembly Committee on Commerce and Navigation reported favorably Judge Green's bill to bridge the Hudson River between Manhattan Island and New Jersey. It was amended by knocking out the single span, and by altering the altitude of the towers to 135 feet, and at the center of the single span 150 feet, with allowance for depression.

Claus Spreckels intends to duplicate his sugar refinery in Philadelphia.

Some of the leading capitalists of Philadelphia are engaged in a plan to merge American and English gas companies and to start the new concern with a capital of $50,000,000. One-half of this amount is said to be already pledged. The new company will be called the American Gas Investment Company. Among the gentlemen engaged in the enterprise are: W. W. Gibbs, Joseph B. Altemus, Robert Glendening, Henry C. Gibson, Thomas Dolan and leading bankers of New York and Boston. It is estimated that there are between $500,000,000 and $600,000,000 in gas plants in this country which may be acquired by purchase by the organization. The company own the Lowe gas patents for the manufacture of cheap illuminating gas.

The first legal step taken by the Peoples' Rapid Transit Company with a view to establishing its right to build a four story viaduct railroad from Park place to Tarrytown, was the commencement last week by proceedings in the Supreme Court Chambers for the condemnation of land. Counsel for the company said that it contemplated a speed of 50 miles an hour, taking passengers from Park place to Tarrytown in 45 minutes. The company is organized under the General Railroad act of 1850 and intends to take private property only and construct its road upon solid masonry four stories high and let out the lower stories for various purposes.

MANUFACTURING.

Iron and Steel.

The employes of the 119-inch mill of the Homestead Steel Works, of Carnegie, Phipps & Co., Limited, of Homestead, Pa., have organized an Amalgamated Association lodge. They have decided to build a clubroom with a gymnasium and meeting rooms attached.

The Dunbar Rolling Mill Company were organized at Dunbar, Pa., on the 17th inst. Stock has been subscribed to the amount of $75,000, and work will be begun at once. A site has been selected half a mile south of the borough limits. The stockholders organized recently with the following officers: C. B. Newman, president; Charles Duggen, vice-president; J. J. Mullen, secretary; S. H. Patterson, treasurer.

Fannie Furnace, of the Wheeler Furnace Company, at West Middlesex, Pa., which has been in steady operation for six months, went out of blast week before last, until repairs could be made. The casting-house, which is now a wooden structure, will be torn down and replaced with an iron one.

The men recently in the employ of Long & Co., late owner of the Vulcan Forge and Iron Works, at Pittsburgh, were paid the money due them on Saturday, the 22d inst. It will be remembered that this firm failed in November of last year, and their plant was recently sold to Charles Lockhart, a capitalist of Pittsburgh.

The plant of the Johnson Company, at Johnstown, Pa., was put on double turn last week. The company are behind in their orders and the mills will be run to their full capacity.

There was a slight strike in the Bessemer department of the Juniata Iron and Steel Works, of Shoenberger & Co., at Pittsburgh, last week. The trouble was investigated by William Weihe, president of the Amalgamated Association, who ordered the strikers to return to work. Some of them refused and their places were at once filled by other workmen. The plant is now in full operation.

The annual meeting of the stockholders of the Allegheny Bessemer Steel Company was held at their office in Pittsburgh on Tuesday, the 18th inst., and the following board of directors were elected for the ensuing year: John S. Slagle, Wm. G. Park, Robert B. Brown, Edward L. Clark, George Bolton, David E. Park and John W. Doubleday.

The Lancaster Iron Company, incorporated with a paid up capital of $200,000 for the purpose of producing muck bar and merchant iron, have secured 10⅜ acres of ground at Lancaster, Ohio, upon which is now being erected a building 520 feet long, of which the finishing department is 100 feet wide and the puddling department 60 feet wide. The establishment has a frontage on the Columbus, Hocking Valley and Toledo Railroad of 1052 feet and will also have direct communication with the Cincinnati and Muskingum Valley Railroad. The following complement of machinery is now on the ground and in process of erection: Twenty puddling furnaces, one 13-inch muck mill, one 16-inch, one 10-inch and one 7-inch bar mill. The boiler capacity will approximate 1000 horse-power, consisting of three 66-inch 5-flue steel boilers 36 feet long, one 6-foot tubular boiler containing 54 4-inch tubes 16 feet long, one 26 x 42 engine for muck rolls, one 26 x 30 Ætna Machine Company's engine for the 16-inch bar mill, one for 10-inch bar mill, one 18 x 22 for 7-inch bar mill, of the same make. The plant will include five heating furnaces for bar mills, two for the 16-inch, two for the 10-inch and one for the 7-inch mills. In addition to the foregoing the establishment will be equipped with a full complement of machine-shop tools, consisting of lathes, shapers, bolt cutters, &c., supplied by the Lodge-Davis Machine Tool Company, of Cincinnati. The machine shop will be 20 x 40 feet. The capacity will be 125 tons per day. A foundry 40 x 60 feet, blacksmith shop 20 x 40 and carpenter shop will also be erected. The fuel used throughout the entire works will be natural gas, obtained from a well on the premises, showing a rock pressure of 550 pounds, and the company expect to be ready to supply finished product by April 1. The officers of the company are Lloyd Gould, president, Youngstown, Ohio; Jas. W. Friend, vice-president, Pittsburgh, and Ralph J. Wick, treasurer and general manager, Youngstown, Ohio, with Geo. P. Motheral, of Pittsburgh, Pa., as secretary. A sheet mill will also be added in the near future.

The John M. Waddell Mfg. Company, Greenfield, Ohio, have erected an addition to the present plant, 40 x 50, two stories in hight. This will increase the present capacity by about 50 per cent. Several new specialties are being prepared by this firm, which will shortly be placed upon the market.

The Dunbar Furnace Company are building an additional fire-brick stove, making seven stoves for their two furnaces. The work is in charge of Frank C. Roberts, civil engineer, Philadelphia and Pittsburgh.

The Illinois Steel Company have determined to erect a second wire rod mill at Joliet, Ill. At a recent meeting of the directors of the company the matter was carefully considered and the construction of the second mill authorized. The present rod mill is the best in the world, having made by far the largest tonnage of any existing mill, but plans are now under consideration by which the management hope to be able to construct a mill which will even surpass the record of the existing one.

The Philadelphia and Reading Coal and Iron Company are about to reline and repair the Emaus Furnace, near Allentown, Pa., and to erect three 18 x 60 Gordon-Whitwell-Cowper fire-brick hot-blast stoves. The contract for this work has been awarded to Gordon, Strobel & Laureau, Limited, blast furnace constructors, of Philadelphia.

C. M. Clark, vice-president, announces that by act of Legislature the name of the Virginia Steel Company has been changed to the Virginia Development Company.

F. B. Baird has leased the furnaces of the Onondaga Iron Company, at Syracuse, N. Y. No. 1 furnace is now being remodelled. Its dimensions will be 62 x 16 feet, and its hot-blast stove equipment will be increased by two new iron-pipe stoves, now building, so that there will be, when completed, four stoves of 24 pipes each. No. 2 will be made 75 x 12 feet, and will be probably equipped with three fire-brick stoves, on which work is to be begun in the spring. No. 1 furnace is expected to go into blast on the 1st of April.

The old River Furnace, upon which Pickands, Mather & Co. have expended $50,000 in repairs, went into blast last week, under the management of J. S. Pollock. The first heat produced No. 1 Foundry iron of excellent quality.

On the 1st inst. P. L. Kimberly & Co., proprietors of rolling-mills at Sharon, Greenville and New Castle, Pa., had unfilled orders on hand aggregating 22,000 tons, exclusive of plates and sheets. All the iron mills in the Shenango Valley are

in full operation, a majority of them having their product sold ahead for some time to come.

Furnace D of the Crane Iron Works, at Catasauqua, Pa., which has been undergoing repairs for some time, was put in blast on Saturday, the 22d inst.

Furnace No. 11 of the Thomas Iron Company, at Hellartown, Pa., has been blown out for repairs.

The stockholders of the Catasauqua Mfg. Company, of Catasauqua, Pa., held their annual meeting on Wednesday, the 19th inst., and elected the following directors for the ensuing year: Oliver Williams, James W. Fuller and John Williams, of Catasauqua; John Thomas, of Hokendauqua; William Henry Trotter, Justice Cox, Jr., and Samuel Dickson, of Philadelphia; Theodore Sturges, New York, and V. W. Weaver, of Macungie. Mr. Dickson is a corporation lawyer of Philadelphia and a valuable accession to the board, taking the place of Mr. Charles Haven, who declined re-election on account of ill health. A new board organized immediately after their election, choosing the following officers: Oliver Williams, president; Henry Davis, treasurer; John Williams, secretary.

Another wire rod mill is projected at Joliet, Ill., in addition to the new mill to be erected by the Illinois Steel Company. The parties interested are stated to be Fish Bros. & Connell, who have raised a capital of $250,000 for the purpose.

Machinery.

Mayor Pearson, of Allegheny City, Pa., has received a letter from C. N. Fitler, vice-president of the National Lathe and Tool Company of Philadelphia, stating that the company desire to establish a plant for the manufacture of all kinds of woodwork by patented machinery There are plants now operating under the patents in London, Eng., Boston, Mass., San Francisco, and Tacoma, Wash. The company desire to start a factory in that city "if a sufficient number of responsible citizens would assume direction and control, contributing sufficient subscription only to handle and operate the plant."

The machine shops of the Oil City Boiler Company, of Oil City, Pa., recently burned down, are being replaced on a larger scale. When in operation again the capacity of the shops will be considerably increased

At the annual meeting of the stockholders of the Leechburg Foundry and Machine Company, held at their office in Pittsburgh, W. D. Rowan, George Mesta, W. A. Cochran, W. J. Steele, J. W. Poffenberger were elected directors. Owing to their increased capacity and business during the past year, it was voted to increase the capital stock from $75,000 to $100,000.

The Latrobe Steel Works, of Latrobe, Pa., have placed the order for their new hydraulic tire mill with William Tod & Co., of Youngstown, Ohio. It will weigh about 85 tons.

To accommodate their rapidly-increasing chilled roll business, the Robinson-Rea Mfg. Company, of Pittsburgh, are adding another 20-ton air furnace and necessary building to their plant, on the South Side, Pittsburgh. They report plenty of orders for sand rolls, especially for shapes, which they design, make and deliver ready for use when so desired.

The Shaw Electric Crane Company, 160 to 168 Clinton street, Milwaukee, Wis., are builders of electric, power and hand cranes. They began business on December 1 and have already received a number of important orders. They are building a 40-ton crane for the Union Pacific Railway Company's Cheyenne shops, for delivery in April. This crane is intended to lift engines from the trucks. They are also building a double trolley electric crane of 30 tons capacity with a hand traveler for the Chapin Mining Company for the express purpose of handling the large engine which E. P. Allis & Co. are building. Numerous orders have been received for smaller sizes of cranes and quite a number of good orders are in prospect from railroads. A. J. Shaw is superintendent of the company.

The Union Ice Mfg. Company, of Pittsburgh, have closed a contract with the Consolidated Ice Machine Company, of Chicago, for two 50-ton ice machines, also with the Hazelton Tripod Boiler Company for two 250 horse-power boilers. The plant will be turning out ice by the middle of June.

The Lewis Foundry and Machine Company, of Pittsburgh, have just shipped to the Pennsylvania Bolt and Nut Company, of Lebanon, Pa , a complete modern 8-inch guide roll train, also a 16-inch merchant bar mill; the latter will roll guide rounds up to 2½-inch diameter. Both trains have a full equipment of rolls. The same firm also furnished a 20 x 36 inch and a 26 x 42 inch Corliss engine to drive the above train. Three pairs of shears and a hot saw were included in the shipment. There was recently successfully cast at these works a hydraulic cylinder weighing 22,000 pounds.

The Sheffler Bridge Company, of Pittsburgh, were granted a charter last week. J. W. Walker, who has heretofore been sole proprietor of the Sheffler Bridge Works, will be president of the new company, F. L. Geist, vice-president and treasurer, and Charles D. Marshall, secretary. The directors are Charles D. Marshall, Howard H. McClintock, and James E. Rogers. The new organization will not take charge until April 1, and the amount of capital has not yet been decided upon. Among recent contracts received by the firm is one for a bridge on the Chicago, Milwaukee and St. Paul, Railroad.

The Chester Foundry and Machine Company, of Chester, Pa., are now building two centrifugal pumps, with boilers, engines and foundations complete and having a capacity, guaranteed, of not less than 24,000,000 U. S. gallons per day, for the Kingsessing and Tinicum Meadow Company, of Philadelphia. These machines form part of an extensive plant intended for draining valuable meadow lands adjoining Philadelphia, and which are under flood during the spring and at certain high tides. The meadow comprises about 4000 acres. The same company are also building for the Jardin Brick Company, of Philadelphia, a hydraulic brick press of the heaviest kind. It is provided with special pumps, accumulators and fittings complete. The weight of the press is about 16 tons. It will be used in the manufacture of ornamental brick, for which the Jardin Company have orders far in excess of their present capacity.

The foundry of the Wayne Agricultural Works, located at Goldsboro, N. C., and which in our correspondence of last week was reported destroyed by fire, will be rebuilt at once.

The Monroe Iron Works Company, of Monroe, N. C., have increased their capital, and will now enlarge their plant.

Akron, Ohio, is continually adding to her manufacturing interests, and has recently added three very large plants to same—namely, the Akron Heating and Ventilating Company the Star Drilling Machine Company, and the Diamond Drill and Tool Company, all of which are well under way. The above named firms have been fully equipped with all the necessary machine tools by the Lodge & Davis Machine Tool Company, of Cincinnati, Ohio.

J. J. McCabe & Co. have leased the entire building at 68 Cortlandt street, New York, and are now making preparations to move into it. They propose to carry a large stock of iron-working machinery, bridge and boiler shop tools, both new and second-hand.

The Lodge & Davis Machine Tool Company have recently furnished Landis Bros., of Waynesboro, Pa., with a full equipment of machine tools for the manufacture of grinding machinery, which will be of the latest and most improved designs.

The Wilken Manufacturing Company, Kinnikinnick avenue, Milwaukee, Wis., are bringing out a new Corliss engine.

A new company has been organized at Springfield, Ohio, to manufacture waterwheels and engines. The officers are: W. C. Leffel, president; Fuller Trump, vice-president and manager, and Percy Norton, secretary and treasurer. The capital stock of the new concern is $100,000.

The Westinghouse Electric Company, of Pittsburgh, has just closed a contract with the Willamette Light Company, of Portland, Ore. The company will furnish 100 arcs and 10,000 incandescents, together with wire and apparatus necessary for the operation of the electric plant. A specially-constructed machine will be used to produce a 4000-volt current. The current will be carried 12 miles before being distributed. The estimated cost of the plant is $200,000.

Hardware.

The Nut and Washer Mfg. Company, manufacturers of washers on Davidson street, foot of National avenue, Milwaukee, Wis., have been in operation now some three years. The capacity of the establishment is at present about a ton and a half of products per day. They have a growing trade, are increasing their capacity and machinery and expect to enlarge their line of products. At present they do not manufacture nuts, but in addition to washers they turn out corner plates for spring beds, riveting burrs and felloe plates. F. Doepke is president of the company, W. Read, treasurer, and A. J. Read, secretary.

Diamond Wrench Company, Portland, Me., are said to be contemplating the erection of a new factory 200 x 80 feet.

The Business Men's Club, of Racine, Wis., have successfully negotiated with the owners of the tack factory, at Delevan, to remove their plant to the former place. The removal will be made as soon as the buildings can be erected. After the signing of contracts an election of officers was held at the Business Men's Club Rooms. S. L. Jackson was elected president; L. S. Blake, vice-president; N. D. Saggun, secretary. It is probable that the new factory will be located on Albert street, north of the rubber factory.

The American Heat Insulating Company, Limited, of Pittsburgh, Pa., manufacturers of pipe and boiler coverings, report a very prosperous season, with future prospects encouraging, and that last year, the second of their existence, their business was 150 per cent. greater than the preceding one; that their manufacture found its way to States bordering on the Pacific and Atlantic Oceans and the Gulf of Mexico.

The East Chattanooga Land Company has issued an illustrated pamphlet on Chattanooga, and its latest suburb, East Chattanooga.

The Iron Age

New York, Thursday, February 27, 1890.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, JR., - EDITOR.
GEO. W. COPE, - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS - - HARDWARE EDITOR.
JOHN S. KING, - - - - BUSINESS MANAGER.

The World's Fair.

While the question of the locality for the World's Fair of 1892 was still under discussion *The Iron Age* studiously avoided participation in the contest, because as a national journal it possesses no preferences. We have been urged to push the claims of New York. We have laid aside strong presentations of the points in favor of Chicago and St. Louis. As was only natural, local interests largely controlled and tinged the views of the advocates of different cities. Aiming as it does to represent impartially the special interests with which its fortunes are so closely connected, in all parts of the country, and in every section, *The Iron Age* could not in justice to all espouse the cause of any one of the contestants. Whatever might be the issue, now practically decided, we felt convinced that local jealousy and mutual disparagement would disappear so soon as the decision had been reached. Once committed to the enterprise, the business men of the whole country will give to it their hearty co-operation. Every effort should and will be made by manufacturers in every section to extend to the citizens of Chicago their cordial aid. Sectional jealousies will soon be buried and all will join in making the World's Fair, as a national undertaking, the great success which it must become.

It will impose upon manufacturers throughout the country burdens which probably they would have avoided if the choice lay with them. They cannot escape them now, and must turn to solving the question how to secure, as an equivalent for financial sacrifices, the maximum of individual benefit. We are convinced that the great majority of exhibitors at the enormous modern shows do not directly or indirectly reap returns which compensate them for the outlays incurred. The impression is far too general that the exhibitors are the principal beneficiaries, and that they therefore must bear the greater part of the cost. This impression is false, and the conclusion is not just. A few may obtain, through the exhibition of their wares, largely increased sales. We can well understand how highly might be prized the opportunity to bring before hundreds of thousands a neat article for household use. But there are, in the hardware, metal and iron trades, hundreds of lines in which little advantage could be gained by having crowds stare at goods day after day for many months.

Overwhelmingly the great good done by modern exhibitions is that they act as educators of the people, and particularly of the rural population. They bring before the latter the latest and best achievements of modern industry, enlarge their views, elevate their tastes and stimulate their ambition. They create new desires, and by fostering the eagerness to purchase, indirectly help the producing power. The good thus done to the community at large is quite out of proportion to the benefits which accrue to the manufacturing industries. Since the Government represents the former, it is only just that it should bear a much larger share of the cost than it has hitherto done. Manufacturers should not, in our opinion, be burdened with an undue proportion of it.

It is just that the citizens of Chicago, who will be directly and indirectly large gainers through the holding of the World's Fair, contribute largely to its cost, as they have pledged themselves to do. But it is unjust to ask them to carry the load alone. Congress should give a very liberal appropriation toward making the exhibition the grand success it must be. But it becomes the duty, too, of all citizens to aid independently in the good work by liberal contributions.

Acting upon the conviction that all interests should join in a hearty support of their Chicago fellow-citizens, David Williams, publisher and proprietor of *The Iron Age*, *The Metal Worker* and *Carpentry and Building*, has subscribed $1000 to the World's Fair fund.

The Wire Rod Industry.

The manufacturers of steel wire rods are evidently bent on making this country permanently independent of a foreign supply. No less than four rod mills of large capacity were completed and started in the past year. These mills, in addition to those previously existing, have gone far toward meeting the requirements of American wire-drawers. But the expansion of this industry has not been checked. Important additions are to be made this year. The Illinois Steel Company, whose rod mill at Joliet has achieved the best record of any rod mill in the world, announce that they have decided to erect a second mill of even larger capacity. Other rod mill projects are under consideration, as auxiliary enterprises to wire-drawing establishments, but they have not yet advanced to the stage of definite undertakings. The crowded condition of machine shops probably deters some of them from being placed under contract at once. With establishments of limited capital, immediate construction means considerably enhanced cost as compared with probable cost when machinery contracts fall off, which it is very desirable to avoid. Hence projects of this kind may be looked for later, when business is dull.

It is becoming more and more the custom among iron and steel manufacturers to make improvements and build extensions when times are hard, and thus prepare at low cost for the heavy demand which is sure to follow a period of forced retrenchment. Consumers of wire rods further state that it is very desirable in times of close competition on wire and wire products to control primary processes of manufacture as far as possible, thus covering every available source of profit.

The success of the wire-rod manufacturers in wresting their trade from foreign control is all the more creditable to them because it has been gained under the very moderate tariff. For years they struggled under decidedly adverse conditions as compared with manufacturers of other finished steel products. Foreign competition was very severe and seemed destined to be perpetuated. But the expansion of the American rod industry was made at a most singularly appropriate time. The rise in prices abroad found the domestic mills ready to take advantage of the opportunity offered to secure control of the trade. And now it is very doubtful if foreign prices can fall to a rate which will make importation profitable, except for special qualities or sizes or at a few points directly on the seaboard.

The Progress of Basic Steel.

It has only been during the past year that a lively and general interest has been taken in this country in the manufacture of basic steel Southern iron-makers and promoters particularly have gone wild over its possibilities lately, and the latter class notably are putting forth some strange ideas, backed occasionally by queer metallurgical talent. They will probably quote in and out of season the significant figures which have just come to our hands through the courtesy of Perry Gilchrist, who has been so long identified with the progress of the process.

Mr. Gilchrist reports that the total production of steel and ingot iron from phosphoric pig during the year 1889 has amounted to 2,274,552 tons, the increase amounting to about 321,318 tons over the previous year, while the total production to date is placed at 10,845,000 tons. In detail the production of different countries was:

The Production of Basic Steel.

Countries.	1889.		1888.	
	Total.	With under 17 per cent. carbon.	Total.	With under 17 per cent. carbon.
	Tons.	Tons.	Tons.	Tons.
England.....	493,919	348,828	408,594	276,476
Germany, Luxemburg and Austria.....	1,481,642	1,185,323	1,276,070	1,026,633
France.....	222,392	159,271	222,393	158,223
Belgium and other countries.....	76,599	71,217	46,237	32,300
	2,274,552	1,764,639	1,953,294	1,493,632

As usual, Mr. Gilchrist has segregated the production of what may be called mild steel, for which the process is particularly well adapted. It will be noticed that there has been a slight gain in the percentage of this class of metal, the figure rising from 76.4 per cent. in 1888 to 77.6 per cent. in 1889. In Germany the percent-

age has remained nearly stationary at 80 per cent., while in England it has advanced from 69.8 to 70.6 per cent of the total. It would be interesting to learn how much of this basic steel was cast from the Bessemer converter and how much from the open-hearth furnace. In our own country the latter is accorded by manufacturers the preference, the majority of recent schemes being for the construction of basic open-hearth furnaces.

Mr. Gilchrist adds that there was produced with the steel some 700,000 tons of slag, containing about 36 per cent. of phosphate of lime, "most of which was used as a fertilizer." This use is one which has appealed with particular force to Southern projectors, but we question whether it will prove the factor which it is expected to become. So far as we can learn, the quantity of basic slag utilized from open-hearth plants abroad is light, and since our Southern plants have thus far looked exclusively to that method of producing steel, some of the hopes entertained may not be realized. The one basic Bessemer plant running in this country, at Pottstown, has been in the fertilizer market for some time past.

Tin-Plate Mines.

The daily press is a great educator. This must be true, for we hear it stated so frequently in after-dinner speeches and at many other times. What is so commonly known cannot be otherwise than true. In view of the important function which the daily press thus fills, it is not surprising that the editorial staff on the daily papers should be well informed with regard to all topics upon which they are called to write. An educator is presumed to be equipped with a vast fund of knowledge on the subject in which he proposes to instruct other people. Being in the business, as it were, to a humble extent ourselves, and knowing the marvelous endowment of the editorial brain generally, we confess that many exhibitions of erudition and original investigation do not excite in us the feeling of admiration which probably animates the minds of those who are merely readers, taking in their dose of instruction as it is servedto them morning and evening by the daily press. Occasionally, however, one of these great public instructors trespasses on our particular domain and furnishes valuable information to the public which we had intended in the fullness of time to communicate. Such an intrusion we cannot help resenting. A flagrant instance of this is the case of the Chicago *Daily News*, in whose editorial columns recently appeared the following brilliant gem of thought: "The canned goods manufacturers yesterday listened to the free-trade speech of a manufacturer, who said a tariff on tin plate would increase the price of canned tomatoes. Of course it would; but cannot the gentleman see that there are lots of fine infant tin-plate mines up in Dakota, owned in part by a British syndicate, that must be fostered and petted and fed like a new-born babe?"

Now, there is only one point in this paragraph which interferes with our mission in the grand work of instructing the public. The *News* can discuss any phase of a public question it pleases and can take any side or both sides if it chooses, but when it serves up a choice bit of information on a technical subject which we thought we alone possessed, we cannot help reminding the editor that he should have left that matter for others to discuss. We refer to the "fine infant tin-plate mines up in Dakota." We knew all about these tin-plate mines and were only awaiting a favorable opportunity to enlighten the public concerning them. But now that the secret is out, we might as well tell the rest. The tin-plate mines of Dakota (now in that part of Dakota called South Dakota by grace of Congress) are among the wonders of the world. Hundreds of thousands of miners daily blast off great chunks of tin plate from the rugged sides of Harney Peak and other hundreds of thousands of workmen take these chunks and saw them up into slabs of regular form and afterward split them like fine shingles into the thin tin plates of commerce, putting the IC by themselves and the IX by themselves, and the XXIC by themselves, &c. Then they pack the shining plates in boxes, putting 12 x 12 and 14 x 20 and other sizes in separately. The *News* got ahead of us in announcing the main fact, but we are certainly first in giving the details. There is nothing like keeping the public instructed. Perhaps the *News* has never heard that daily papers grow on trees in this same wonderful Dakota. We might give some information on this point, but we would then be going outside of our province and might subject ourselves to adverse criticism, so we forbear telling all we know, even if it would result in the enlightenment of the public.

The Standard Market Reports.

There are perhaps but few of our readers who are not to some extent interested in our market reports. Even those who are not directly connected with the commercial transactions of their own establishments usually glance over the reports from the different trade centers to keep themselves posted on the condition of business generally throughout the country. Yet it may be doubted whether the value of these weekly reports is at all correctly gauged. It may frequently happen that a reader is aware of transactions during the period covered by a report at rates somewhat at variance with those given, and at once the value of the report suffers in his eyes. Other readers may not have mingled with the trade for several days, and they may be incredulous regarding the condition of affairs set forth as to their own particular business center. There are some who find fault with market reports on general principles, believing that their interests would be best served by a policy of complete silence with regard to the tendency of trade or the fluctuations of prices. They are hardly likely to prove impartial judges of the value of a report.

It is not with the view of converting the opponents of the publication of trade prices that this topic was selected for discussion, but for the purpose of a little self-glorification. The circumstances seem to justify it. Modesty is, of course, always becoming, but there are cases in which one can be permitted to sound his own praises. The publication of regular reports on the condition of the American iron trade, and of ruling prices for leading iron and steel products, written by capable and conscientious reporters, was begun by *The Iron Age* early in its history. This feature of the paper has been steadily maintained and expanded, keeping pace with the expansion of the iron trade, and now each issue presents a faithful picture to the manufacturer or merchant of the condition of business and course of prices in leading iron and steel commodities in all the most important markets of the country.

Many of the shrewdest merchants acknowledge the value to them of these market reports. Even when the reports are not used as a basis of transactions, a watchful business man will often detect the appearance of a tendency in iron and steel circles which will give him the key-note for contemplated operations. But the special value of our market reports and quotations lies in the fact that they are regarded as standard throughout the entire trade, and as so closely portraying actual conditions that they can be accepted as authoritative. The courts admit them in evidence when submitted by either of the parties in a suit. In numerous manufacturing establishments the schedules of wages are based on our reports. Ore contracts are frequently made on a basis of prices to conform to our quotations on pig iron. Foundrymen arrange with their customers to charge for castings a sliding scale based on our weekly quotations of the price of pig iron. Purchasers of old railway material agree with railway companies to pay the rates which we quote. Innumerable instances of the same character might be cited to show the practical bearing which our quotations exert on the complex relations of trade, but these will suffice. They amply sustain our claim that our reports and quotations are standard.

With our own knowledge of the value which our market reports have attained comes a deep sense of the responsibility resting upon us to make them as correct as possible. No pains are spared to get at the true situation in the leading trade centers of the country. Every effort is taken to get reports from competent individuals whose aim is to seek the truth and to report it regardless of the special interest it may serve or displease. Recognizing the element of time lost in receiving reports by mail from distant markets, we have recently inaugurated at considerable expense a system of telegraphic advices through which information is thus brought down almost to the hour of going to press. This telegraphic service will be greatly extended in the future, making our reports still more valuable and effectually stamping them as the standard reports of the country.

Late Developments in the Argentine Republic.

Argentine affairs have of late attracted a great deal of attention. The monetary and financial crisis has continued with unabated virulence, the paper money now having declined to 40 cents on the dollar, and some heavy failures of mercantile firms having occurred. Some three or four months since another loan of £8,000,000 was to be floated in Europe, the proceeds of which the Government intended to use to procure a fresh gold supply to depress the gold premium, but the European bankers made it a condition that while making this loan the Government should withdraw and destroy $41,000,000 of paper money, which it declined to listen to, for, strange to say, while at Buenos Ayres and Rosario paper money abounds, there is a positive scarcity of it in several of the provinces in the interior. It appears that the depreciation of the paper money arises less from a plethora of it and of hypothecary notes (*cédulas*) than from a lack of confidence in the management of the national finances. There are even direct accusations that certain positive promises in connection with the issue of *cédulas* or their limitation are not kept. The attitude which the Department of Finance has observed toward the gold brokers on the Buenos Ayres stock exchange has been decidedly hostile, and matters have thereby been aggravated. While all this has occurred the importation of goods diminishes and with it the revenue from customs. In collecting import duties the treasury assumes the paper dollar at 85 cents gold, hence these in reality only produce about half the amount of gold coin they should. The consequence is that with the obligation to pay interest in gold in Europe on the hundreds of millions of loans of all sorts, national, provincial, municipal, railroad, &c., there is a gold drain, which is becoming all the heavier the less the Government receives gold from the customs.

The financial situation would indeed become inextricably bad at short notice if, fortunately for the country, its magnificent resources did not at this juncture come to its rescue. After two bad harvests the cereal crops this year are described as being so abundant that of wheat alone it is estimated there will be a surplus for export of something like 60,00,000 bushels, a similar amount of Indian corn, and barley and minor grains as well as linseed in proportion. While this is the case, the wool clip is very satisfactory not only in point of quantity, but quite as much as regards quality, the wool bringing bigger prices than ever. The quality of Argentine wool is at present more appreciated than ever before. At the late Paris exhibition out of 188 prizes awarded Argentine wool received 112 prizes. The only Argentine product not bringing renumerative figures is dry hides. These sold at New York in former years at 18 to 21 cents per pound, whereas to-day their value is only 13¾ cents. On the other hand, beef and mutton in refrigerator steamers to England are doing remarkably well.

The large amount of grain, wool and meat about to be shipped to Europe will bring a sum of gold into the country in all the current year large enough to very much alleviate both the monetary and financial condition, not only of the national, but of the provincial governments. It is to be hoped that better management of the Treasury Department at Buenos Ayres may coincide with the happy change anticipated, and that there may not be a rush to again launch out with new financial schemes. European capitalists are duly forewarned, and not likely to open their purse-strings till they can clearly see that a radical, favorable change is at hand, restoring confidence at home and abroad.

The number of immigrants landed last year was greater than ever, for it reached the grand total of 289,014, of whom 89,647 were Italians, 71,151 Spaniards and 27,131 Frenchmen. Probably 75 per cent. of these new comers go direct inland and swell the population of hard-working field hands and farmers. At any rate, every facility is afforded the *bona fide* settler in the agricultural districts to run his own farm at no distant day, and it is this circumstance, combined with the fine, mild and healthy climate, which attracts such a steadily increasing current of settlers from the Mediterranean and the Basque provinces of Spain. Nobody need despair of a country possessing such natural resources and the working population to make them fructify and expand.

We have received from Charles Himrod & Co., of Chicago, a photograph of a cast-iron pipe manufactured by Turner, Dickinson & Co., of that city. As is shown by the inscription on it, the pipe is 6 feet long, 20 inches in diameter, and ⅛ inch thick, and it was made from all Calumet iron. Turner, Dickinson & Co. are manufacturing these in large quantities, and are using exclusively Calumet iron, and the success with which they are made is indicated by the statement that their loss does not reach 5 per cent., or 1 in 20. Himrod & Co. think this is the best evidence they could give of the fluidity and non-shrinking qualities of Calumet iron, as it would require not only good foundry practice but good metal to make such a casting. They will be glad if any one will advise them of any better results obtained in making such work with any mixture of iron known.

The Chicago, Milwaukee and St. Paul Railroad Company, who have been heating their cars by steam for some time, have now added electric lighting to their conveniences, and provided as effectually as possible against all danger of having overturned cars destroyed by fire. An extra car or consort is attached to the tender of the engine. This contains a marine boiler to furnish steam for heating and also for running an engine and dynamo to supply the electric lights. A storage battery is also provided to be used in case of accident to the dynamo or engine, but thus far the battery has not been required. The boiler of the consort is so constructed that if overturned the water would be turned into the fire to extinguish it, and, besides that, the car is lined with steel inside and outside.

THE MINING ENGINEERS.

Washington Meeting.

There are strong evidences of renewed interest in the gatherings of the American Institute of Mining Engineers, no meeting during recent years having brought together so large a representation of the older active members as that which gathered for the first session on Tuesday evening, the 18th, inst., at the National Museum in Washington. Among those present during the whole or a part of the meeting were :

Emerson L. Foote, of the Sligo Furnace.
H. G. Torrey, of the U. S. Assay Office.
W. Thaw, Jr., of Pittsburgh.
A. E. Hunt, of the Pittsburgh Reduction Company, Pittsburgh.
David T. Day, in charge of the Mineral Statistics of the Geological Survey and the Census.
Arnold Hague, Romaine Cole, of the Scovill Mfg. Company, Waterbury, Conn.
Dolphus Torrey, Dr. T. M. Drown and R. H. Richards, of the Massachusetts Institute of Technology.
Jerome Wheelock, of engine fame.
Prof. T. Egleston and H. S. Munroe, of Columbia College.
E. G. Spilsbury, Trenton Iron Company.
W. E. C. Eustis; A. A. Blair; H. B. Colburn, Bedford City, Va.
W. B. Cogswell, of the Solvay Soda Works, Syracuse.
W. H Wiley, the American correspondent of London *Engineering*.
F. L. Garrison; Jerome L. Boyer, of the Chestnut Hill Iron Company.
Edwin Mickley, of Hokendauqua.
David Williams, R. R. Williams and C. Kirchhoff, Jr., of *The Iron Age*.
C. B. Dudley, Chemist of the Pennsylvania Railroad, Altoona.
E. H. Cowles, of Lockport, N. Y., of the Cowles Electric Smelting Company, manufacturers of aluminum alloys.
R. M. Thompson, of the Orford Copper Company.
W. S. Ayres, who has charge of the Dickerson mines, New Jersey.
G. W. Maynard, president of the Bower-Barff Rustless Iron Company.
John Birkinbine, secretary of the United States Association of Charcoal Iron Workers.
H. M. Chance; S. T. Wellman, consulting engineer of the Illinois Steel Company; R. W. Hunt, of Chicago.
C. R. Claghorn; E. C. Pechin, N. S. Scaife, of Pittsburgh.
J Eyerman; T. Catesby Jones, Iron Gate, Va.
J. F. Holloway, of the Worthington Steam Pump Company.
Percival Roberts, Jr., of the Pencoyd Works.
H S. Hungerford; W. S. DeCamp, D. S. Jacobus, of the Stevens Institute.
F. H. McDowell; W. J. Taylor, of Philadelphia.
G. M. Lehman; W. Atkins, of Pottsville; J. D. Ormrod.
J. C. Porter; Daniel Eagan, Sharon Steel Casting Company.
H. M. Boies, Dickson Mfg. Company, Scranton, Pa.
E. C. Jewitt; S. E. Bachman, Salem, Va.
C. H. Zehnder, Jackson & Woodin Mfg. Company, Berwick, Pa.
Jed Hotchkiss; Kennett Robertson; R. G. Leckie, Nova Scotia.
W. Glenn, R. A. Cook, representing the Wenstrom magnetic separator.
S. F. Emmons; Victor O. Strobel; Jos. D. Weeks, Pittsburgh.
D. W. Langdon, Cincinnati.
Jones Wister, Philadelphia.

Oberlin Smith, Ferracute Machine Company, Bridgeton, N. J., and
Clark Fisher, Trenton, N. J.

The Opening Session

was held in the National Museum, which was for the first time illuminated by electricity. General Rosecrans, chairman of the local committee, bade the Institute welcome, greeting being also extended by Prof. S. P. Langley, secretary of the Smithsonian Institution, and by Major J. W. Powell, director of the United States Geological Survey, to which Richard Pearce, president of the Institute, responded appropriately. In the absence of the authors the secretary read a biographical notice of Charles A. Ashburner, by Prof J. P. Lesley, and a biographical sketch of the late Franklin B. Gowen, by Eckley B. Coxe, of Drifton, Pa.

Wednesday morning and afternoon was given over to an excursion to Mount Vernon, a meeting to be held on the steamer during the trip being abandoned as impracticable.

The first session at which business of any general interest was transacted was held on Wednesday evening, the first session being opened with a note by T. C. Mendenhall, superintendent of the Office of Standard Weights and Measures of the United States Coast and Geodetic Survey, on

STANDARD WEIGHTS AND MEASURES.

It is only recently that the United States has acquired new standards placing it on a footing with other nations. Mr. Mendenhall called attention to the curious fact that although it has the power Congress has never prescribed a system of length and mass units, with the exception of those for coinage. In 1866, however, Congress legalized the metric system of weights and measures, the only one adopted by act of Congress. In 1875 the United States became a member of the International Bureau of Weights and Measures, now including in its membership the principal civilized nations of the world. This International Bureau near Paris, made exhaustive and elaborate investigations, among which were those which led to the adoption of an alloy of 90 per cent. of platinum and 10 per cent. of iridium as the metal for the standard meter bars and kilograms. The old original meter bar was an end standard; the new one is a line standard. Two sets were allotted by lot to the United States. One of them was recently brought to this country and was received appropriately by the President. Mr. Mendenhall showed a model of the standard meter which is in cross section like a letter H, a form which secures the advantage that the bar can be supported in any position without flexure. As to the accuracy of this standard exact investigations have not yet been carried through. Mr Mendenhall, however, felt sure that the error did not exceed one in ten millions.

Mr. Mendenhall offered for distribution tables for converting customary and metric weights and measures, just published by the office of Standard Weights and Measures.

John Birkinbine followed with a paper on

CRYSTALLINE MAGNETITE IN THE PORT HENRY MINES.

The deposit referred to the now famous Lover's Hole at Port Henry, N. Y., where in the center of a mass of pure ore an enormous quantity of fully developed crystals were found in a space 20 feet wide and 10 to 12 feet thick.

The output of nearly, if not quite, 40,000 gross tons of ore, taken from this (Lover's Hole) opening shows the average iron contents to be 68.6 per cent., and the average phosphorus contents to be 0.033 per cent. These averages represent all of the ore removed from this working, and are obtained by adding together the 30 analyses of the ore made between March 2 and December 28, 1889, and dividing by 30. These determinations were made of samples taken practically from each carload shipped by rail from the mines to Port Henry, and delivered to the laboratory every week or ten days.

The 30 determinations are given below to indicate the extreme range of composition, and they are arranged in order of their iron contents in preference to using the chronological order adopted in the chemical laboratory by T. Reed Woodbridge, chemist for Witherbees, Sherman & Co., at Port Henry, N. Y., who made all of the analyses and other valuable data for this paper.

Concerning the determinations, it is probable that the highest percentage of iron—viz., 72 per cent., found in the early development of this working — was obtained from a sample in which crystals were abundant, while the lowest iron contents—viz., 61.2 per cent.—was evidently determined from an excess of lean ore or the presence of wall rock after the workings had been considerably extended, for we find the next lowest analysis shows 65.10 per cent. of iron. The laboratory dates of these two analyses indicate this to be the case. The one determination showing 72 per cent. of iron was checked by a second analysis; there are also two analyses between 71 and 72 per cent. and seven between 70 and 71 per cent. One third of the determinations, therefore, indicate 70 per cent. or over of iron.

The variations in the phosphorus contents are from 0.011 to 0.060, but the two instances in which the phosphorus reached the latter figure showed in the same samples 67.20 and 68.45 per cent. of iron, so that in no instance does analysis show that the phosphorus exceeds one part in 1120 of iron.

The following are the 30 determinations above referred to, kindly supplied by Mr. Woodbridge:

	Iron. Per cent.	Phosphorus. Per cent.		Iron.* Per cent.	Phosphorus. Per cent.
1*...	72.00	0.018	23....	67.20	0.060
2....	71.70	0.022	24....	67.00	0.042
3....	71.20	0.026	25....	66.70	0.030
4....	70.60	0.023	26....	66.60	0.026
5....	70.40	0.011	27....	66.10	0.036
6....	70.40	0.022	28....	65.20	0.042
7....	70.40	0.048	29....	65.10	0.048
8....	70.25	0.045	30....	61.20	0.024
9....	70.20	0.021			
10....	70.20	0.051			
11....	69.90	0.025	Average.	68.60	0.033
12....	69.90	0.046			
13....	69.50	0.013	Maximum	72.00	0.060
14....	69.20	0.020			
15....	69.10	0.023	Minimum	61.20	0.011
16....	69.10	0.031			
17....	69.00	0.025			
18....	68.70	0.030			
19....	68.45	0.060			
20....	67.80	0.038			
21....	67.70	0.054			
22....	67.20	0.035			

* Two determinations.

F. A. Pocock, of Boston, presented some data on

ELECTRICITY IN MINES,

the paper being substantially a description of the electric haulage at the Erie colliery of the Hillside Coal Company, at Scranton. The power plant consists of a standard Armington & Sims engine, capable of developing 60 horse-power, and a 50 horse-power Thomson-Houston generator, wound for a current of 220 volts potential, and the necessary appliances for its operation. The engine and dynamo room at the top of the shaft are in charge of the engineer and assistant who operate the other mining machinery. From the dynamo to the foot of the shaft the current is conducted by No. 0 Clark wires, enclosed in gas-pipes to protect them from damage. From the bottom of the shaft the wires are carried overhead about 12 inches outside of the low rail of each track, and are suspended from an insulator specially designed for this class of work. Wherever turnouts occur frogs are used, the conductors being soldered to them in the same manner as when used for street railway work. Connections from the mains to the overhead conductor are made at suitable intervals, and a portion of the current is utilized for lighting purposes, two 110-volt lamps being placed in series. There are 50 of these lamps; 8 at the foot of the shaft, 2 in the pumping-room, 4 in the blacksmith shop and 2 in the slope-room, the remainder being distributed along the gangway.

The rails are used as conductors for the return current, copper end connections effecting a complete metallic circuit. In adapting the tracks to the electric system it was found necessary to make a few changes to accommodate the increased output. The shaft sidings accommodate 70 loaded cars and 50 empties, whereas before they had a capacity for but 15 on each side. The locomotive embodies many new features in motor construction and general design. It is built for a 3-foot gauge and is of the following dimensions: Length over all, 9 feet 7 inches; width, 5 feet 3 inches, and hight, 5 feet 6 inches. This last dimension can be considerably reduced by placing the rheostat at one end instead of on the top, as has been done in the present instance. The weight of the locomotive is 10,500 pounds, to which 1800 pounds has been added to increase traction. The motor employed is of the type "G" railway motor of 40 horse-power. A novel trolley arm is used requiring no attention when the motor is reversed. Its construction is such that a wide variation in the position of the conductor is permissible, a range of 3 feet 6 inches being easily covered, while the meeting of an obstruction simply causes the trolley arm to fall by the side of car without resulting in any damage. From the trolley wheel the current passes along the arm to the fuse boxes, then through the rheostat and motor to the rail. Pinions on the armature shaft mesh with intermediate gears, connection between these and slotted connecting rods being made through the ordinary crank pin and box. This arrangement allows for variation in position between the wheels and body of locomotive which carries the motor; and, as the crank pins on opposite sides are placed at an angle of 90°, there are no dead points. The brake mechanism, rheostat and reversing switch may be operated from either end by the hand-wheels shown in the cut. The operator has everything under complete control and can start or stop the car and reverse its direction without moving from one position.

The locomotive is run by one man, who is assisted by a boy in making up the trains and turning the switches. It displaces seven mules and three drivers. During a period of 11½ days the average number of cars delivered at the shaft bottom by the locomotive was 559.5, against 526.95 per day delivered by mule haulage, much time being consumed by waiting at the bottom of the shaft for empty cars. Thus far the locomotive has shown that it will increase the daily output to 700 cars per day. The operations are as follows:

East or Slope Side.

Distance run per trip, including making up, &c	2884 ft.
Time of trip	10½ min.
Cars per trip	15
Trips per day	15
Miles run per day	8.73
Total time	2 h. 40 min.

Locomotive reversed 128 times per day.

West or Plane Side.

Distance run per trip, including making up, &c.	2546 ft.
Time of trip	6½ min.
Cars per trip	20
Trips per day	25
Miles run per day	1255
Total time	2 h. 50 min.

Locomotive reversed 104 times per day.

To deliver 700 cars per day of 10 hours, the time of running the locomotive is 5 hours and 30 minutes, leaving 4 hours and 30 minutes for contingencies. The total distance run is 21.28 miles, and the locomotive is reversed 232 times.

Richard Pearce, president of the institute, delivered an address on the Association of Gold with other Metals in the West, which was followed by a description, illustrated with lantern slides, of Stripping Ore Deposits, by F. H. McDowell, of New York. Mr. McDowell, who has been associated with the work of uncovering the Tilly Foster Mine, at Brewsters, N. Y., described the methods successfully employed there. They have been applied more recently to the Peters Mine, of Cooper Hewitt & Co., at Ringwood, N. J., and at the Bertha Zinc Mine, in Virginia.

Thursday morning was given over to a visit to the Navy Yard, a more detailed description of which will be presented in *The Iron Age* at an early date.

In the afternoon the members and their ladies were received at the Executive Mansion by the President and Mrs. Harrison, while in the evening a banquet was held at the Arlington Hotel.

Professionally, the interest in the meeting centered in the Friday sessions, which were to be given over to the reading and discussions of papers and subjects connected with the manufacture and properties of aluminum.

Captain A. E. Hunt, of the Pittsburgh Reduction Company, Pittsburgh, Pa., opened the series with a paper on "The Properties of Aluminum," the joint production of Mr. Hunt, Professor J. W. Langley and Charles M. Hall, an abstract of which we publish elsewhere.

The secretary, Dr. Raymond, read a note from G. H. Abbott, referring to the discovery in New Mexico of a deposit of sulphate of alumina containing 37 per cent. of sulphuric acid, 18 per cent. of aluminum, the balance being insoluble matter and water.

Oberlin Smith, of Bridgeton, N. J., read two papers, one entitled "Aluminum in Search of a Nickname," and the other "Aluminum in the Drawing Press." The latter, which is the record of experiments carried on at the Ferracute Machine Company, is accompanied with illustrations, which we shall publish in a future issue.

At the close of the session the secretary read the annual report of the council, which shows the institute to be in a flourishing condition financially. The membership is now 1968. Entering the fiscal year with a balance of $5880.28, the increase was $23,343.71, while the expenditures were $18,714.11, leaving a balance at the end of the year of $10,509.88.

The reading and discussion of aluminum papers was continued on Friday afternoon, Eugene H. Cowles, of Lockport, N. Y., reading a paper on Physical Properties of some of the Alloys of Manganese Copper and Aluminum, which we shall present at an early date. Dr. R. W. Raymond presented a brief abstract of a very elaborate paper by W. J. Keep, of Detroit, Mich., on Aluminum in Wrought Iron and Steel. The last of the series was that by F. P. Dewey, of Washington, descriptive of the Heroult Process of Smelting Aluminum Alloys. This process has been in use abroad and an experimental plant is now running at Boonton, N. J. The paper has been withdrawn for some modifications.

The discussion, which was to have embraced the entire series of papers, practically turned on the last, Mr. Dewey being asked a series of searching questions, framed with the view to bring out the essential features of difference between it and the Cowles method. During the course of the debate he was asked whether the Heroult process did not really produce aluminum by direct reduction of carbon, and not by electrolysis. Mr. Dewey answered by asking how a current could well be passed through a fixed mass containing alumina without electrolysis. He stated that the distinctive claim for the Heroult process was the electrolysis of a mass of melted alumina, the aluminum and the alloying metal being maintained in a fluid condition by the passage of the current. He reported that in making a 25 per cent. alloy the variations were not more than ½ to ¾ per cent., and that an alloy as high as 60 per cent. of aluminum could be produced. This is obtained in one run direct, and not by making first one run and using the alloy produced to obtain a higher grade by a repetition of the operation. Mr. Dewey stated also that no carbon is charged with the alumina. E. H. Cowles in the course of the discussion placed himself on record as stating that the Heroult process was a plagiarism of the Cowles method. The session closed with the reading of a paper by Prof. H. S. Munroe entitled "Notes on Modern Methods and Apparatus of Surveying."

Saturday was utilized by a considerable number of the party for an excursion to the gold mines of Montgomery County, Md., a distance of 15 miles from Washington. The mines were discovered by Dr. W. Kempster and developed successfully by him and by Senator Sawyer.

CORRESPONDENCE.

Wellsburg as a Manufacturing Center.

To the Editor.—We noticed in an Eastern paper a communication from an Eastern iron manufacturer in which he claims the Ohio Valley will in the near future become the manufacturing center of the world. The reasons given are plausible, and we have every reason to believe his claims will be substantiated. There are sections of the Ohio Valley that have what to us seems advantages for manufacturing that are not to be found elsewhere Take for instance the city of Wellsburg, W. Va., lying as it does on the Ohio River, surrounded by as fine an agricultural country as can be found anywhere (its population is about 3500). The city is built on a piece of river bottom about three miles long and half a mile wide, with many good manufacturing sites. The hills lying immediately back of the city are underlaid with a fine vein of what is known as Pittsburgh coal, which as yet is in the hands of the land-owners and could be purchased at a very low figure compared with prices paid elsewhere. There is also an abundance of lime-stone, building stone and sand close at hand. A number of gas wells have been put down in this vicinity, some of them being as large producers as have been found anywhere, but owing to a want of proper care, &c., they have become exhausted. It is shown conclusively, however, that Wellsburg is in the gas belt. The shipping facilities are good. A branch of the Pennsylvania system is on either side of the river with the prospect of a trunk line from Pittsburgh to Chicago 73 miles shorter than any other route. This we have every reason to believe will be built in the near future. The river is the most important carrier, especially to iron manufacturers. The Pittsburgh and Cincinnati packet line are running five through steamers, there being also three independent steamers. There are also being built 20 light-draught steamers and 60 barges to ply between Pittsburgh and Kansas City. The river has kept at a good boating stage for the last two years. HARDWARE.

Among new corporations announced in Illinois last week are the following: The United States Roofing Company, at East St. Louis; to manufacture and sell roofing and sheathing for buildings and cars in the State of Missouri; capital stock, $2,000,000; incorporators, George Shields, H. L. Sutton and George Wenzlick. The Wayne Sulkyette and Road Cart Company, at Decatur; to manufacture road carts and other vehicles; capital stock, $40,000; incorporators, W. J. Wayne, D. W. Brenneman, and G. A. Kellar. United States Cold Wire Rolling Company, at Chicago; for cold-rolling of metals into wires; capital stock, $500,000; incorporators, H. B. Bryan, Frank Weeks, and Franklin Hatheway. Marquette Electric Construction Company, at Chicago; to operate electric machinery for the purpose of furnishing light, heat and power; capital stock, $25,000; incorporators, Alfred L. Baker, Samuel S. Parks and Eben F. Runyan, Jr. Chicago Long-Distance Telephone Company; to maintain a telephone line; capital stock, $1,000,000; incorporators, W. R. Omohundro, L. M. Hopkins, W. M. Rheem. Dephosphorized Iron Company, Chicago; to manufacture iron and steel by patented processes; capital stock, $60,000; incorporators, W. J. Joy, John G. McKinney, Max Livingston. The Andrews Manufacturing Company, at Rock Falls; to manufacture and sell railway track-cleaners; capital stock, $20,000; incorporators, E. A. Andrews, G. A. Gampsen and J. G. Manahan. Moline Elevator Company, at Moline; to manufacture and dispose of passenger and freight elevators; capital stock, $12,000; incorporators, F. M. Andrus, R. K. Swan and W. E. Tolles. Automatic Mower and Manufacturing Company, at Chicago; to manufacture agricultural and other machinery; capital stock, $150,000; incorporators, N. G. Moore, W. E. McIlvane, H. G. Adcock, East St. Louis Hardware Company, at East St. Louis; to conduct a store, shop, and factory, to buy and manufacture hardware, &c.; capital stock, $5,000; incorporators, F. W. Hackman, L. Beckemeyer, and Charles Beckemeyer. Joliet Enterprise Company filed certificate of an increase of capital stock from $150,000 to $250,000.

Judge Barrett, on application of Morgan & Worthington, counsel for Robert J. Lewis, William B. Bishop, Anna L. Bishop and Amos Tenny, has granted an injunction against the New York and Perry Coal and Iron Company, George A. Blood, Francis P. Perkins and Charles C. Allen, trustees, restraining the last named from disposing of the stock they hold until an accounting is made to the company concerning their transactions and dealings with it in the increase of its capital stock and the purchase of the property for which such stock was issued. The plaintiffs charge in their complaint among other allegations, to which no answer has yet been made, that the three defendants, while, in June, 1887, trustees of the company, caused the capital stock of the company to be increased from $1,500,000 to $3,000,000 and issued the 15,000 additional shares of stock in payment for property acquired in Perry County, Ohio. It is asserted that the three defendants named concealed from the company that they were owners of or were otherwise interested in the property in question.

A Southern firm of manufacturers who intend to add a malleable iron department to their establishment desire to secure the necessary drawings and data for such a plant.

TRADE REPORT.

Chicago.

Office of *The Iron Age*, 59 Dearborn street, CHICAGO, February 24, 1890.

Pig Iron.—The market is in such a curious condition that scarcely two people can be found whose views coincide. Last week we were able to report an improvement in the demand, and the appearances at that time were strongly in favor of an early resumption of activity. Speculative lots seemed to have been well cleared up, and furnacemen were becoming confident of getting control of the market again. But now the aspect of affairs has changed. Orders are coming in very slowly, and overstocked consumers have been seized with a desire to unload their surplus. It is not an uncommon experience for a salesman soliciting an order to be asked by the foundryman whether it would not be possible to work off a few hundred tons of Iron for him in some other direction. Prices of Coke Foundry Iron have consequently fallen quite considerably, as sales have thus been made at whatever rates were necessary to tempt the purchaser. Some of the furnace owners have put their prices down accordingly, being determined to hold their trade, while others still quote as before, thus making a very decided spread in current quotations. Southern furnace owners have thus far maintained a firm front, but outside lots of Southern Coke Iron are to be had in sufficient quantity to keep the market supplied at from $1 to $1.50 below makers' prices. Bessemer is much lower than it has been, dealers being quite confident that they could find the Iron to fill orders at $21, but buyers do not seem willing to pay even that much for it. Notwithstanding this unsatisfactory state of the trade, it is surprising to find a cheerful feeling among the most prominent Pig Iron merchants, who regard the present depression as only temporary. They look for a reaction at an early day because their order-books show such a solid basis of business for the future. Some of them have not yet begun to deliver Bessemer Iron, for which they took heavy contracts with large consumers, who will commence to call for it shortly. Foundry Iron will then be less plentiful. Softeners have been in quite active demand in small lots, and prices are steady on such grades of Pig, both American Scotch and Silveries. Lake Superior Charcoal is quiet but firm, an occasional carload moving at $23, but large consumers evidently will not pay so much. Makers' quotations are as follows, f.o.b. Chicago, for cash:

Lake Superior Charcoal	$23.00 @	....
Local Coke Foundry, No. 1	19.00 @	$20.00
Local Coke Foundry, No. 2	18.00 @	19.00
Local Coke Foundry, No. 3	17.00 @	18 50
Am. Scotch (Strong Soft), No. 1	21.25 @	22.00
Ohio Silveries, No. 1	19.25 @	20.00
Southern Coke, No. 1	20.25 @	....
Southern Coke, No. 2	19.50 @	....
Southern Coke, No. 3	19.25 @	....
Tennessee Charcoal, No. 1	21.50 @	22.00
Alabama Car-Wheel	26.00 @	27.00
Bessemer	21.00 @	....

Bar Iron.—Manufacturers report a fair volume of business, with one or two large car orders brightening the prospect. Prices are again weak, however, as some of them find their customers slow to send in specifications upon which they had relied to keep their force of men at work. They still quote 1.90¢ @ 1.95¢, half extras, Chicago, for fair specifications of Common Iron from mill, but these prices are shaded for round lots or otherwise desirable orders. Small lots from store are now selling at 2¢ @ 2.10¢.

Structural Material.—Architectural foundries are estimating on a great deal of work for the approaching season. Makers quote mill lots as follows, f.o.b. Chicago: Angles, Iron or Steel, 2.45¢ @ 2.55¢; Universal Plates, Iron, 2.50¢; Steel do., 2.55¢ up to 16 inches and 2.70¢ for wider than 16 inches; Steel Sheared Plates, 2.80¢; Beams and Channels, 3.20¢. Concessions are made on round lots, except for Beams and Channels. Store prices for small quantities range from two to three tenths above mill lots.

Plates, Tubes, &c.—The heavy orders alluded to last week were duly placed, but were secured by distant mills. One was for 1200 tons of Tank Iron and the other for 250 tons Fire-Box Steel. Considerable business was done in Plates besides, some buyers being disposed to take hold for future shipment. Prices are being shaded, the mills evidently seeking for orders. Carload lots from mill are quoted at 2.45¢, f.o.b. Chicago, for Tank Iron; 2.80¢ for Tank Steel; 2.80¢ for Nos. 10 to 14 Iron Sheets, and 3¢ for Steel do. Store trade has been very fair, with prices on small lots ranging about as follows: Nos. 10 to 14 Iron Sheets, 2.90¢; No. 16 do., 3¢; No. 18, 3.25¢; Nos 10 to 14 Steel Sheets, 3¢ @ 3.25¢; No. 16 do., 3.50¢ @ 3.75¢; No. 18 do., 3.75¢ @ 4¢; Tank Iron, 2.75¢ @ 2.80¢; Tank Steel, 3¢ @ 3.10¢; Shell Iron and Steel, 3.25¢; Flange Steel, 3.50¢; Fire-Box, 4.25¢ @ 5.50¢; Boiler Rivets, 4¢ @ 4.25¢; Norway Rivets, 40 %; Boiler Tubes, 1¾ inches and smaller, 45 %; 2 to 4 inch, 50 %; 4-inch and larger, 52½ %.

Sheet Iron.—Some orders are in the market for Black Sheets, but prices are as irregular as was stated last week, Standard No. 27 Common being quoted at 3.25¢ @ 3.30¢, Chicago, in carload lots, from mill, while other makes are to be had at lower rates. Small lots from store are selling at 3.40¢ @ 3.50¢, according to quantity.

Galvanized Iron.—The demand keeps up, but prices are not firm, except for the very best brands. Small lots of Juniata are quoted at 60 % off.

Merchant Steel.—Manufacturers' agents still quote carload lots, f.o.b. Chicago, as follows: Open-Hearth Machinery and Toe-Calk, 2.75¢ @ 2.85¢, Spring, 2.65¢ @ 2.90¢. Small lots from store are selling at the following rates: Open-Hearth Machinery, Toe-Calk and Spring, 3¢ @ 3.25¢; Bessemer Bars, 2.50¢ rates; Tire, 2.50¢ @ 2.65¢; Tool, 7½¢ and upward; Crucible Sheets, 7¢ @ 10¢.

Steel Rails and Fastenings.—In Steel Rails the prospects are reported to have brightened very materially. Inquiries are increasing, and, although the sales of the past week have been confined to small lots, the manufacturers are now sanguine that in the course of another week or two the market will show a decided change from the long prevalent dullness. Quotations are maintained at $37.50 @ $38. Large orders for Splice Bars have been placed, but although local mills named quite low rates they were beaten by competitors elsewhere. Usual quotations, f.o.b. Chicago, are as follows: Iron Splice-Bars, 1.90¢ @ 2¢; Spikes, 2.25¢ @ 2.30¢; Square-Nut Bolts, 2.80¢ @ 2.85¢; Hexagon do., 2.95¢ @ 3¢.

Old Rails and Wheels.—The price of Old Iron Rails at Chicago ranges from $24.50 to $25. Transactions have occurred at the former price and railroad purchasing agents report offers of the latter rate. In the interior of the State they have been sold at $24. Old Steel Rails are in active demand, with a rising tendency, being quoted at $21.50 @ $22, according to length, &c. Old Car-Wheels are nominally worth $19 @ $19.25, with very light transactions.

Scrap.—Not much business has been done in this line recently, except in Steel, which continues strong. Some specially selected Heavy Wrought Scrap was sold at $21 @ $21.50 ℔ net ton. Ordinary No. 1 Forge would not bring over $19.50, but holders are not willing to sell at that price. Other grades of Scrap are quoted by dealers as follows, ℔ ton of 2000 lb: Fish Plates, $22; No. 1 Mill, $16 @ $16.50; Nos. 2 and 3 Mill, $11; Horseshoes, $19; Old Axles, $25; Pipes and Flues, $15; Cast Borings, $9.75; Wrought Turnings, $13.50; Axle Turnings, $15; Stove Plate, $11; Machinery Cast, $13 50; Mixed Steel, $16.25; Coil Steel, $18.50; Leaf Steel, $18.50; Tires, $17.

General Hardware.—Shelf and Heavy Hardware jobbers continue to report a very satisfactory trade in progress, with business steadily increasing. The demand is now coming from a much wider area. The country roads continue in most wretched condition, owing to alternate freezing and thawing, so that the good demand for Hardware now existing is really remarkable.

Barb Wire.—Business is now active in this branch of trade, and heavy orders are being received. Painted is quoted at 3.45¢ for less than carloads and 3.35¢ for carloads; Galvanized, 60¢ ℔ 100 lb advance over Painted.

Pig Lead.—Heavy transactions are reported, mainly confined to sales from one source. Values have been a trifle stronger owing to temporary causes, and closes with 3.65¢ @ 3.67½¢ bid, and 3.70¢ asked.

Nails.—Manufacturers' agents have had but a light inquiry for Cut Steel Nails since the adoption of the new card. Some mills outside of the Wheeling district are cutting prices, but seem to be able to induce very little buying. Wire Nails are more freely called for and are being quoted at $2.95, Chicago, for carload lots from factory. Some sellers of Wire Nails are endeavoring to change their system of quoting from 60 days or 2 % off for cash to cash within 30 days. This would be quite a reform if it could be adopted generally. The new Lakeside Nail Company, lessees of the East Chicago Steel Works, expect to be in the market with their Cut Steel Nails shortly after the 1st of March. Jobbers quote Cut Steel Nails at $2.50 in less than carloads, $2.45 in carloads; Wire Nails, $3.15 in less than carloads. Prices on the latter are being shaded according to circumstances.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St. PHILADELPHIA, Pa., February 25, 1890.

It is a difficult matter to report the market with exactness, as prices vary according to the circumstances in each individual case. Those who must sell are not in a position to secure full quoted rates, while those who are content with meeting the regular day to day demand have no difficulty in maintaining their prices. It is a dull and disappointing market, nevertheless, and the outcome is not entirely clear. The general impression in the trade is that there may be three or four weeks more of uncertainty and irregularity, but that ultimately prices will again develop an advancing tendency. The unsettled condition of the market is said to be due to speculative lots coming in competition with the regular output. This applies not only to Pig Iron, but in some measure to Steel Billets, Rails and Finished Iron. The position is certainly very embarrassing; cost has advanced pretty well up to full nominal quotations, yet manufacturers are called upon to meet competition—in some cases with their own products—at prices actually below to-day's cost. It is felt, therefore, that these speculative lots will have to be got out of the way before any sustained upward movement can be expected. Mean-

while it is satisfactory to find that stocks are not accumulating at furnaces, and as regards the rolling mills, they appear to have work enough to keep them fully employed from week to week, so that it is only a question of time when business will be again diverted to its usual channels.

Pig Iron.—Prices are well maintained for good Foundry Irons, but in other descriptions more or less weakness has been developed during the past few days. Nearly all the leading companies, however, are sold ahead for several weeks to come, but outside lots are offered somewhat urgently at $17.25 to $17.50 for what are claimed to be good qualities of Mill Irons, but without attracting buyers. The position as regards Mill Irons seems to be that standard brands are held at from $17.50 to $18 delivered, others offered at less money, with bids for round lots at about $16.50 @ $16.75, with a possibility of business being done at $16.75 @ $17. But the feeling is very feverish, and it would not take much to cause either side to change their position. Foundry Irons are relatively in a better position. The supply is not in excess of the demand and sales are easily made at $18.50 @ $19 for No. 2, and $19.50 @ $20.50 for No. 1, delivered at tide, or its equivalent. A careful watch is kept on the Western and Southern markets, as we are largely dependent on the way they move. Locally everything is in good condition for firm or higher prices, but it is not to be supposed that quotations will be made out of proportion with those in other markets. As we have said for some weeks past, "it's a waiting market," without any very clear indication of changg in either direction for the present.

Bessemer Pig.—No disposition to trade on either side. Furnaces are all sold ahead for some time to come, and for the same reason buyers are equally well supplied. It is thought that orders might be placed at about $21, at furnace, but as there is no demand, prices are entirely nominal.

Speigeleisen.—There is some little inquiry at about $35 @ $35.50 for 20 %, but sellers quote $1 more, with some prospects of business being done at a little under $36.

Ferro-manganese.—Sales of 80 % for immediate delivery have been made of small lots at from $100 to $102, and 70 % at $83 @ $85. For spring and summer shipment, however, $88 is quoted for 80 %, and $75 @ $80 for 70 %.

Steel Rails.—The market has a firmer look than for some weeks past. Buyers find that $35 is an inside figure, and are therefore more inclined to place orders It is intimated that some large lots are likely to be taken shortly, and in the meantime $35@$35.50 at mill is quoted, according to quantity, delivery, &c. The feeling is undoubtedly improving.

Billets and Slabs.—Business has been very quiet of late, and prices are hard to quote. There are sellers at $36, delivered, for Billets, and $34.50 @ $35 for Nail Slabs, but firm offers at a dollar less money are hard to get, which in some cases it is thought might be accepted for the right kind of an order, but in the absence of actual sales it is impossible to give exact quotations.

Blooms.—Prices about $52 @ $53 "per Bloom ton" for Hot-Blast Charcoal, and $54 @ $55, delivered, for Cold-Blast. Runout Anthracite, $44 @ $45, and Scrap Blooms, $35 @ $36, delivered in consumers' yards.

Muck Bars.—Business is very dull in this department, the only sales reported being at $31.50 at mill. Some ask higher figures, but buyers talk not over $32, delivered, while at interior points prices are said to be very little over $30.50 at mill.

Bar Iron.—The market continues in the same dull and sluggish condition as noted for some weeks past. Mills seem to have plenty of work for the present, but there are indications of a willingness to make concessions rather than lose the chance of a desirable order. Cost is up to a point that leaves little or nothing to the manufacturer at quoted rates, although these are by no means adhered to. On the contrary, 1.85¢ at country mills is considered a fair average price, and 1.90¢ @ 1.95¢ is about all that can be obtained at mills on the seaboard. The demand is very slow, but in connection with old contracts mills have managed to run pretty full so far.

Skelp Iron.—The demand is slow and disappointing, and, as may be supposed, prices are a little off. Sheared is quoted at 2.10¢ @ 2.15¢, delivered, and Grooved 1.95¢ @ 2¢, but there is very little business done unless concessions are granted.

Plates.—The market is fairly steady, but as mills are beginning to come within sight of the end of last year's contracts they are more anxious for business, and on the right kind of orders are willing to make concessions. The bulk of the business offered, however, is small lots for prompt delivery, and on these quoted rates are fairly maintained. Large orders would undoubtedly be taken at less money, but as business of that kind is not to be had prices are more or less nominal, as follows:

	Iron.	Steel.
Tank	2.25 @ 2.30¢	2.55¢ @ 2.65
Shell	2.55 @ 2.65¢	2.90¢ @ 3.10
Flange	3.25¢	3.15¢ @ 3.25
Fire-Box	3.75¢	3.75¢ @ 4.25

Structural Material.—This department runs very much in unison with the Plate trade, so that remarks made under that heading are equally applicable here, although the shaped material mills are probably better supplied with work than those engaged exclusively on Plates. Prices are steady at about the following quotations: 2.30¢ @ 2.35¢, delivered, for Iron Bridge Plate; 2.25¢ @ 2.30¢ for Angles, with 20¢ @ 25¢ more for the same in Steel. Tees, 2.8¢ @ 2.9¢; Beams and Channels, 3.1¢ for either Iron or Steel

Sheet Iron.—The demand in this department continues heavy for thin Sheets, but is somewhat less active on the low numbers. Prices are nominally unchanged, but on desirable orders concessions are not infrequent. Carload lots command about the following prices:

Best Refined, Nos. 14 to 20	3.10¢
Best Refined, Nos. 21 to 24	3.30¢
Best Refined, Nos. 25 to 26	3.50¢
Best Refined, No. 27	3.60¢
Best Refined No. 28	3.70¢
Common, ¼¢ less than the above.	
Best Soft Steel, Nos. 14 to 20	3¼¢
Best Soft Steel, Nos. 21 to 24	3⅜¢
Best Soft Steel, Nos. 25 to 26	3⅝¢
Best Soft Steel, No. 27	4⅛¢
Best Bloom Sheets, 1-10¢ extra over the above prices.	
Best Bloom, Galvanized, discount	60 %
Common, discount	62½ %

Old Rails.—It is a difficult matter to say what should be quoted to-day. Last sales were at $28, delivered at mill near Harrisburg, and they are offered at $27.50, Philadelphia, but buyers appear to be perfectly indifferent, and say they can get all they want at much lower figures. It is probable, however, that to do business sellers would have to make important concessions, as the demand is by no means urgent. A sale of Old Steel Rails was made last week at $22, delivered in consumer's yard.

Scrap Iron.—Market full and prices weak and irregular, with sales at about the following prices: No. 1 Wrought, $24 @ $25, Philadelphia, or for deliveries at mills in the interior $25 @ $26; $16 @ $17 for best Machinery Scrap, $15 @ $15.50 for ordinary, $16.50 @ $17 for Wrought Turnings, $11 @ $11.50 for Cast Borings, and $28 @ $30 for Old Fish-Plates, and $18 @ $19 for Old Car-Wheels.

Nails.—There is a pretty fair demand, but prices are again unsettled and weak. Carload lots are nominally $2.10, but sales have been made at $2.05 and less, so that quotations at $2.10 are merely nominal. Lots from store, however, are held at $2.20.

Wrought-Iron Pipe.—The demand is not urgent, but mills are fully employed, and prices firmly maintained. Discounts unchanged, as follows: Butt-Welded Black, 47½ %; Butt-Welded Galvanized, 40 %; Lap-Welded Galvanized, 47½ %; Lap-Welded Black, 60 %; Boiler Tubes, 1¼ inches and smaller, 45 %; Boiler Tubes, 2 to 4 inches, 50 %; Boiler Tubes, 4½ inches and larger, 52½ %; Oil Well Casing, 52½ %.

Pittsburgh.

Office of *The Iron Age*, Hamilton Building, PITTSBURGH, February 25, 1890.

One great drawback to business is the bad weather and almost impassable condition of the roads In many parts of the country horse-power as a means of transportation has not been available during a great part of the winter, and orders for Iron and Steel have been materially curtailed thereby.

Pig Iron.—There has been very little change in the situation during the past week; business continues extremely dull, but it is expected there will soon be an improved demand, in view of the fact that many consumers have been drawing upon their stock for the past two months, refusing to buy, and these will soon be obliged to replenish, although for a time they may buy only as their immediate necessities require. However, notwithstanding the absence of demand at the present ttme, there is not much Iron offering; our city furnaces are all working on contracts made some time ago, when prices were better than they are at present. The fact that there is a cargo of Iron *en route* from Sheffield, Ala., by river appears to be attracting more attention at other places than here; there has been more or less of this Southern Iron used here for several years Prices as compared with those a week ago remain unchanged:

Neutral Gray Forge	$17.50 @ $18.00,	cash.
White and Mottled	16.50 @ 17.00,	"
No. 1 Foundry	19.50 @ 20.00,	"
No. 2 Foundry	18.50 @ 19.00,	"
No. 2 Charcoal Foundry	21.50 @ 22.50,	"
No. 1 Charcoal Foundry	24.50 @ 25.00,	"
Bessemer Iron	21.50 @ 22.00,	"

In regard to Bessemer Pig there have been no sales reported of late, and it is difficult to quote correctly. Some of the brokers report that they are still offering to sell at $22, cash, without finding buyers. It is surmised that there will be a movement some of these days, and if so, higher prices are not improbable and there is no doubt but what those of a speculative turn have their eye on the Bessemer interest.

Muck Bar.—There is little or nothing doing, and the market is weak at $29.50 @ $30, cash, with rumors that it is being offered as low as $29. Until the Wrought-Iron Pipe mills, the largest buyers, start up full, there is not likely to be any improved demand.

Manganese.—We are advised of sales of 80 % Ferromanganese at $100 for immediate or near-by delivery. Foreign has been reported at all kinds of prices during the week, $95 down to $90, according to delivery.

Manufactured Iron.—There is no change to note, either in regard to demand or prices; the former is fair, while the latter are easier in sympathy with the raw material. Large buyers are holding back or buying only as their immediate necessi-

ties require, with the intention of keeping themselves in position to take advantage of the same if prices should go lower. Bars, 1.90¢ @ 1.95¢; Plates, 2.35¢ @ 2.40¢; No. 24 Sheet, 3¢ @ 3.10¢; Skelp, 1.85¢ @ 1.90¢ for Grooved and 2.10¢ @ 2.15¢ for sheared, all 60 days, 2 % off for cash.

Nails.—The Nail trade continues light, but it is expected that it will soon begin to show signs of improvement, for which there is plenty of room. Cut Nails remain unchanged at $2.25, in car lots, 60 days, 2 % off for cash, and $2.35 for less than a carload. Wire Nails have been again reduced, and we now quote at $2.80, 60 days, 2 % off for cash, in car lots.

Wire Rods—Are weak and lower, and we reduce our quotations to $51 @ $51.50, cash, ℔ gross ton. A fair business is reported.

Wrought-Iron Pipe.—The demand keeps up well for the season and will improve with the advent of settled weather, which has more to do with the Pipe trade than people generally have any conception of. While the mild weather has been favorable for putting down Pipe, the impassable condition of the roads has prevented transportation. Pipe manufacturers are looking anxiously for good weather. Prices remain unchanged. Discounts on Black Butt-welded Pipe 47½ %; on Galvanized do., 40 %; on Black Lap-Welded, 60 %; on Galvanized do., 47½ %; Boiler Tubes—1¼ inch and smaller, 45 %; 2 to 4 inch, 50 %; 4 inch and larger, 52½ %; Casing, 57½ %. The regular monthly meeting of the association takes place in Philadelphia to-morrow, Wednesday, but it is not likely that there will be any change made in prices.

Billets and Blooms.—There is a fair inquiry for Bessemer Steel Billets, but prices continue offish. We now quote at $34.50 @ $35, with intimations that sales have been made as low as $34.25; Nail Slabs about the same as Billets.

Structural Iron.—There is an increasing inquiry, which it is expected will result in considerable new business within the next few weeks. Prices are easy and for some kinds a little lower: Angles, 2.35¢; Tees, 2.85¢; Channels, 3.10¢; Sheared Bridge Plates, 2.80¢; Universal Mill Plates, 2.50¢.

Steel Plates.—There is a continued fair business reported, but prices are weaker, and for some kinds lower. Fire-Box, 4¼¢ @ 4¾¢; Flange, 3.40¢; Shell, 3.20¢; Tank, 2.80¢.

Merchant Steel.—All kinds of Bessemer Steel are weaker, while Crucible and Open-Heath are still holding in price. Tool Steel, 8¢ ℔ lb and upward; Crucible Spring Steel, 4¢; Open-Hearth, base sizes, 2¾¢ @ 3¢; Bessemer Machinery, 2¼¢; Tire Steel, 2.65¢.

Steel Rails.—There is some inquiry, but the market is easier. Several small sales made during the past week at $35, cash, at mill, but it is intimated that a desirable order could probably be placed below the price quoted.

Old Rails.—There appears to be no demand whatever in this market. However, sales have been made here for delivery at Youngstown and Toledo at $27, which shows a decline of from $1.50 to $2 ℔ ton as compared with the highest point. Steel Rails are also weaker, and we now quote at $23 @ $23 50, with a sale of 500 tons reported at the inside quotation.

Railway Track Supplies.—Demand only fair and prices easier, but unchanged. Spikes, $2.15, on cars at works here, 30 days, and $2.25 at Chicago and St. Louis; Iron Splice Bars, 2¢ @ 2.10¢; Track Bolts, 3.10¢ with Square and 3.20¢ with Hexagon Nuts.

Old Material.—The demand has fallen off and prices are weaker; sales No. 1 Wrought Scrap, at $22, net ton, and Car Axles at $28.50; Cast Scrap is quotable at $16, gross, and Old Car-Wheels at $20 @ $21.

The branch offices of the Allegheny Bessemer Steel Company, of Duquesne, Pa., have been removed from the corner of 30th and Smallman streets, Pittsburgh, to Rooms 407 to 414 in the Penn Building. We are advised that the report that Mr. Slagle had withdrawn from the firm of Nimick & Co., Iron Commission Merchants, of Pittsburgh, to devote his whole attention to the Allegheny Bessemer Steel Company is without foundation.

Detroit.

WILLIAM F. JARVIS & Co., under date of February 24, 1890, say: The market, which appeared considerably more active a week ago in inquiries and orders, seems now to have resumed the waiting position, which has made it a decidedly quiet week for all grades of Pig Iron. There have been very few transactions of any note whatever. Notwithstanding the dullness during the present year, very little weakness has been shown in Lake Superior Charcoal Iron, as the makers are well stocked with orders taken during the closing months of 1889, and a thorough canvass of the buyers' stocks and of their probable future wants shows that the channel for Lake Superior Charcoal Iron will be much broader during the present year than it was during the past. Particularly may this be said of the Malleable Iron output. It is bound to be larger, while the presence of continued orders for railway equipment would indicate that orders for Car-Wheels will also be of greater magnitude. Speculative lots do not seem to be offered as freely as during the early part of the month, and evidently have been fairly well bought up. The market continues strong, except in spots. Foundries are very busy, and some good-sized purchases of Iron are looked for within the next thirty days in nearly all parts of the country. The market is quotable as follows:

Lake Superior Charcoal, all numbers	$22.50 @ $23.50
Lake Superior Coke Bessemer	23.50 @ 24.50
Katahdin (Maine Charcoal)	20.00 @ 20.50
Lake Superior Coke Foundry, all ore	20.50 @ 21.50
Lake Superior Coke Foundry, cinder mixed	20.00 @ 20.50
Standard Ohio Blackband	20.00 @ 21.00
Southern No. 1	20.00 @ 21.00
Southern Gray Forge	18.00 @ 18.50
Jackson County (Ohio) Silvery	19.50 @ 20.00
Old Car-Wheels (nominal)	20.00 @ 21.00

Cleveland.

CLEVELAND, February 24, 1890.

Iron Ore.—The market has improved in firmness and activity. Many sales of Non-Bessemer Ore have occurred during the past week at prices fully up to the quotations prevailing for the past two or three weeks. Non-Bessemer, Specular and Magnetic ores are bringing $5.50 @ $6; Non-Bessemer Hematites, $4.75, and Non-Bessemer Menominees, $4.50 @ $4.75. Some Bessemer Ore has also been sold but not in very large amounts, while the prices were slightly above market prices. The prospects of an early opening of the navigation season is having the effect of bringing the vessel owners to the front with offers to accept contracts for carrying Ore at existing rates, viz: $1.10 from Escanaba, $1.25 from Marquette and $1.35 from Ashland and Two Harbors. It is believed that vessels enough have already been engaged to transport 8,000,000 tons of Ore from Lake Superior to Lake Erie ports the coming season.

Pig Iron.—Although the market cannot be called active, furnacemen seem in no way disturbed. No large display of Iron is on hand at any of the furnaces and any accumulation of stock is not anticipated for many weeks to come. The furnacemen seem quite willing, however, to accept small orders providing no concessions in prices are demanded. The tone of the market is certainly improving and an early advance in quotations and restoration of activities is confidently predicted. Bessemer Iron is not in great demand, but Foundry and Mill Irons are selling much more freely than for the past month. Several sales of No. 1 Foundry are reported at $19.50 @ $19.75, cash, at the furnace. Neutral Mill Irons command $17.80 @ $18.30, and Red Short, $18.80 @ $19.30.

Scrap Iron.—Old Americans are slowly declining in value and cannot be bought at $25.50 @ $26. There is, however, a very weak demand for Old wheels at $19.50 @ $20. Wrought Scrap is selling freely at $21.

Coke.—Furnacemen are buying freely at present prices—$2.15 at the ovens—in anticipation of an increase in quotations in March.

A meeting of representatives of all the lines interested was held in Cleveland last Saturday to harmonize the rates on Iron Ore from Lake Erie ports to Ohio River and Hocking Valley points. The conference was a very long one, and at the conclusion it was announced that the rate had been fixed at $1.05 per ton.

St. Louis.

OFFICE OF *The Iron Age*, 214 N. Sixth st., ST. LOUIS, February 24, 1890.

Pig Iron.—A review of the situation shows no special change in the general condition of affairs. Consumption is light, and the volume of transactions for the week under review does not foot up very large. Notwithstanding the apparent apathy in the demand prices show no immediate signs of weakness, but are even firmer than two weeks since. This strength in prices is more directly traceable to the agreement entered into by a number of the leading furnaces in the South some six months ago, in which it was agreed not to cut prices. It is a difficult matter to make any forecast as to the future of the market. It is generally believed that if prices can be sustained—as they have been—in the face of this dullness it seems quite reasonable to suppose that higher prices will be quoted with the resumption of demand. In the meantime we quote as follows, for cash, f.o.b. St. Louis, taking into consideration the reduction of freight rates from Southern points to this market, which amounts to 30¢ ℔ ton.

Southern Coke, No. 1 Foundry,	$19.00 @ $19.75
Southern Coke, No. 2 Foundry,	18.50 @ 19.00
Southern Coke, No. 3 Foundry,	18.00 @ 18.50
Gray Forge	17.50 @ 18.00
Ohio Softeners	20.50 @ 21.00
Lake Superior Charcoal	24.00 @ 24.50
Missouri.	
Charcoal Foundry, No. 1	21.00 @ 21.50
Charcoal Foundry, No. 2	20.00 @ 20.50
Tennessee.	
Charcoal Foundry, No. 1	20.00 @ 20 50
Charcoal Foundry, No. 2	19.75 @ 20.25

Connellsville Coke, f.o.b. East St. Louis, $5.65; St. Louis, $5.80.

Bar Iron.—The market remains in about the same condition as last reported. The demand is very satisfactory and prices are firmly adhered to, as follows: Lots from mill command 2¢; small lots from store are quoted at from 2.15¢ to 2.20¢.

Barb Wire.—The cut freight rate to Texas points is still in force, and mills are now all working double turn so as to fill

as many orders as is possible before the re-adjustment of said rates, which takes place on or about March 1. There is no difficulty in obtaining full prices; indeed, it is more a question of shipment than otherwise. It is reported that a leading jobber is selling Wire at a very low price, but as his stock does not amount to more than 2500 or 3000 spools the effect on the market cannot be very disastrous. Mills quote as follows: Painted, 3.45¢; Galvanized, 4.05¢. Carload lots 10¢ ℔ cwt. less than above prices.

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts.
CINCINNATI, February 24, 1890.

Pig Iron.—Local Iron-factors returned from Alabama this morning bring little more of an encouraging nature. The associated furnaces of the district visited in the South have given no evidence of a change of base, but, on the contrary, they have drawn some satisfaction from the fact that by heavy shipments upon old contracts stocks at furnaces have not shown the increase which was generally and confidently expected. Beyond this point, however, the general features of the situation seem to favor consumers rather than producers of Pig Iron. Further large orders for cars have been placed by several large railroads recently, but the booking of these contracts has not been followed by any increase in the demand for Pig Iron, while the Bar Iron sold has developed further weakness. A sale of 2000 tons Bar Iron is reported at Indianapolis at 1.77½¢, but the particulars are not given. The C. C. C. and St. L. (Big Four) R. R. has contracted for 1000 cars with Barney & Smith, Dayton, Ohio, and for 1000 cars with the Missouri Car and Foundry Company, at St. Louis, Mo. The Lafayette Car Company have secured an order for 1000 cars from the New York, Ontario and Western and a large order also from the Pennsylvania Company. Buyers for round amounts of Pig Iron who have tested the market have expressed the intention to buy no Iron until within a short time of its actual use, which it is estimated will not be until June or July. Other buyers forced into the market have been content to purchase small amounts for actual necessities. But as a rule inquiries have been small. Iron in second hands has been greatly depleted, but enough remains to cause no little annoyance to stacks disposed to sell. Prices of all kinds and grades retain the nominal character which has distinguished them for several weeks. The demand for Car-Wheel Iron has not resulted in any more sales of moment. The cash rates current at Cincinnati, f.o.b., are as follows:

Foundry.	
Southern Coke, No. 1	$18.00 @ $19.00
Southern Coke, No. 2	17.50 @ 18.50
Southern Coke, No. 3	17.00 @ 17.50
Ohio Soft Stone Coal, No. 1	18.50 @ 19.00
Ohio Soft Stone Coal, No. 2	17.50 @ 18.50
Mahoning and Shenango Valley	18.00 @ 18.50
Hanging Rock Charcoal, No. 1	21.00 @ 23.00
Hanging Rock Charcoal, No. 2	20.00 @ 22.00
Tennessee and Alabama Charcoal, No. 1	19.50 @ 20.00
Tennessee and Alabama Charcoal, No. 2	18.50 @ 19.00
Forge.	
Gray Forge	17.00 @ 17.50
Mottled Neutral Coke	16.50 @ 17.00
Car-Wheel and Malleable Irons.	
Southern Car-Wheel	23.00 @ 24.00
Hanging Rock, Cold Blast	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable	23.00 @ 25.00

Manufactured Iron.—The large sales of Bar Iron made at Indianapolis and Toledo at low prices has somewhat demoralized the market recently, but there has been more animation at the lower rates. Merchant Bar is quotable at 1.80¢ @ 1.90¢ and Charcoal Bar at 2.80¢ @ 2.90¢.

Nails.—The market has been quiet and easy in tone at the re-adjustment of prices by the association. Steel Nails, 50d to 60d, sell at $2.50 ℔ keg, with 10¢ rebate in car lots, at mill; 5¢ ℔ keg more for 40d, 10¢ for 30d, 15¢ for 12d, 16d and 20d, 20¢ for 10d and 20¢ for 8d. Iron Nails rule 10¢ @ 15¢ ℔ keg less than Steel; Steel Wire Nails sell at $3.05 @ $3.15 for 60d.

Old Material.—A weaker tone has prevailed, with less demand, freer offering and sales of Rails on the C. and O. road at $26, cash basis. Old Wheels have been dull, heavy and neglected, and are nominally quotable at $19, spot cash..

Louisville.

LOUISVILLE, KY., February 24, 1890.

Pig Iron.—The situation has not changed since last report, the larger furnaces declining to shade prices and consumers unwilling to buy, so that it is impossible to effect sales, save where furnaces are not acting in harmony with the larger companies or speculators are offering Iron at concessions. Notwithstanding some bargains have been offered to those inquiring for Iron, few sales are reported, as buyers are very much puzzled in regard to the future action of the market, and the naming of low prices causes alarm rather than induces to buy. There are indications, however, that the inactivity noted for some time is passing away, and before long sales of some magnitude will take place. It is hardly thought that sales can be effected at present prices immediately, but that later on prices will be fully maintained is the judgment of those largely interested as producers, and also of many consumers who yet feel disinclined to buy, though having confidence in the future. In the East and portions of the West, several round lots have been sold, but in each case at concessions.

Southern Coke, No. 1 Foundry (new classification)	$18.75 @ $19.25
Southern Coke, No. 2 Foundry (new classification)	18.25 @ 18.75
Southern Coke, No. 3 Foundry (new classification)	17.75 @ 18.25
Gray Forge	17.25 @ 17.75
White and Mottled, different grades	16.00 @ 17.00
Silver Gray, different grades	16.75 @ 17.75
Southern Charcoal, No. 1 Foundry	18.75 @ 19.75
Southern Charcoal, No. 1 Mill	17.50 @ 18.00
Southern Car-Wheel, standard brands	23.50 @ 24.50
Southern Car-Wheel, other brands	19.25 @ 21.75
Ganging Rock Coke, No. 1 Foundry	18.75 @ 19.25
Hanging Rock Charcoal, No. 1 Foundry	22.00 @ 22.50
Hanging Rock, Cold Blast	24.00 @ 26.00

Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts.,
CHATTANOOGA, February 24, 1890.

Pig Iron.—It can hardly be a mistake in stating that the market is now an advancing one, at least it looks that way, and the next few days will see prices 25 @ 50¢ higher than they are now. Many of the furnaces have no Iron to sell at all on immediate shipment, and some none even during the next 60 days. There are some sales that have been made on a basis of $16 for No. 1 for shipment after 60 to 90 days, but spot Iron is very scarce, not only in this but in the Birmingham district. An interview with a large consumer who has recently returned from the latter district develops the fact that $15 for No. 3 was the cheapest price he could get on 1000-ton lots and that was on a basis of cash on shipment. Some of the stacks would not quote less than $16.50. Our furnaces are in a very strong position, and although largely sold ahead, yet our contracts are so worded that all shipments are subject to strikes and other unavoidable delays, and the question of strikes although said to be settled, is far from being so. Very few of the operators that are not aware that there is a strong undercurrent of dissatisfaction and that a general and pronounced strike is liable at any time, which should it become universal over the South would send prices up out of sight. The furnace being built at Johnson City is now well under way, as is also the furnace at Rome, Ga. The latter is under contract. The foundations are being laid Some of the castings are now being received, and is to be completed in August ready to turn out Iron. A large sum of money is specified in the contract which is to be forfeited provided the contract is not complied with by that time. The much-talked-of recent shipment of several thousand tons of Pig Iron from Sheffield to Pittsburgh as being the first shipment ever made out of the Tennessee River is an error. During the forties and fifties there were several small stacks on the banks of the Tennessee River above here that marketed nearly all their products in barges out of the Tennessee River on what is known as the "tides," while on the same Tennessee the stacks were as "thick as hops," all the product being sent out on the waters of the Tennessee River, and the reputation of the Tennessee Iron was well known all over the United States. As soon as the Government shall have finished the improvements at Muscle Shoals the facilities for getting Iron or any other heavy freight to market will be very much cheapened, probably 20 ℅ to 50 ℅ from all points on the Tennessee River and its navigable tributaries. Neither can the famous Iron producing district of Birmingham fail to be benefited by it. A railroad is being constructed from there to the nearest point on the river by which Iron can be delivered at the river not to exceed $1 ℔ ton, which added to the barge freight would make the freights to all Western river points much cheaper than any of the railroad lines can take it.

New York.

Office of *The Iron Age*, 66 and 68 Duane street,
NEW YORK, February 26, 1890.

American Pig.—With the exception of an occasional small lot from second hands offered at figures below our quotations, the market continues steady, but very quiet. Some sales agents report that inquiries are coming in more freely, but as yet they do not seem to have led to any transactions of magnitude in this immediate vicinity. Some of the merchants still have Iron to dispose of purchased during the rise. This Iron is now coming due, and in some cases is not yet placed. We continue to quote $19.50 @ $20 for No. 1, $18.50 @ $19 for No. 2 and $17.50 @ $18 for Gray Forge, tidewater delivery.

Spiegeleisen and Ferromanganese.—The market has been very dull and easy, no transactions of any consequence being reported. We quote 20 ℅ Spiegeleisen $35.50 @ $36, with the market in buyers' favor. In Ferromanganese business has been light, with 80 ℅ at $90 for April and May delivery and $85 @ $87 for second half of the year. We are indebted to S. G. Brock, Chief of the Bureau of Statistics, for the following statement, which separates for the calendar year 1889 the quantities of Spiegeleisen from the other kinds of Pig Iron imported and entered for consumption:

Articles.	1888.	1889
Speigeleisen, tons	71,604	99,481
All other Pig Iron, tons	123,587	51,469
Totals	195,191	150,950

Of course the quantity of manganiferous material, expressed by Manganese units, has increased even more, since it is well known that the imports of Ferro were much larger in 1889 than they were in 1888. The true method of reporting on manganiferous material would, of course, be to state the total Manganese

contents of the stock imported, which is now practically impossible.

Billets.—The market is very dull. It is reported that a small lot of foreign material for a special purpose has been offered at a price lower than that asked by domestic mills. Reports from Wheeling and Pittsburgh indicate a slightly better feeling.

Wire Rods.—There is some inquiry. The market is distinctly easier, and it is reported that $53 @ $53.50 could be done for tidewater delivery. A meeting, postponed from Monday, is being held to-day at Pittsburgh, of the different rod mills. The subject for discussion is a plan to consolidate the ownership in all the rod mill patents. It is stated that options have been secured on both the continuous mill and Garrett mill patents. The initiation in the movement has been taken by a Pittsburgh concern. If successful, the consolidation would head off the projects for the building of rod mills by outside parties.

Steel Rails.—In the aggregate the sales of Eastern mills foot up to 20,000 tons, of which 10,000 tons was for a Southern road. Rumors of additional sales have not been verified. The feeling is easier, the market being $34.50 @ $35 at Eastern mills, while Pittsburgh quotes $35, with reports afloat that lower prices have been made.

The Boston office of A. Milne & Co., Iron and Steel merchants, of this city, has been removed from No. 28 to No. 8 Oliver street, Boston.

Cleveland Foote, well-known in the New York Iron trade, has been appointed agent in this city of the Tredegar Iron Company, of Richmond, Va., manufacturers of Spikes and Fish Plates.

Financial.

The general tone of business is conservative, there being little tendency to speculation, and trading is mainly confined to actual demands for consumption. Threatened changes in the tariff and uncertainties respecting the monetary disasters account in part for the prevailing disposition. The almost impassable condition of country roads in all directions not also had a retarding influence. At the same time it is observed that railroads have been severely taxed in providing means of transportation. The shipments of corn from the interior will be large, in view of the extensive engagements made for March to May deliveries to ocean steamers. In the last week, however, there was a decrease of nearly 10,000 tons in the eastward movement from Chicago. Reported orders for 1,000,000 tons of Steel Rails already booked by manufacturers indicate an earnest determination to improve railroad facilities without delay and at the same time show that confidence in the future has not abated. Motive power and rolling stock will receive corresponding additions, giving to labor profitable employment.

The stock markets have been irregular and generally lower. On Thursday and Friday there was a vigorous attack on Tennessee Coal and Iron, attributed by some to the ill-will of former directors. Trusts declined in consequence of realizing and in the absence of demand. The appearance of the bank statement was the signal for a new assault. On Monday Tennessee Coal and Iron again broke down and the market was feverish. At the close there was a sharp advance in the grangers, with the average prices fractionally higher than on Friday.

On Tuesday stocks opened firm on buying by Chicago, based on the decision of the House that the World's Fair be held in that city, but the market closed dull and steady. The market for sterling was weak, owing to considerable purchases of stocks for London account. Posted rates closed at $4.82½ @ $4.86½. Exports of merchandise from New York for the week were $6,810,204; imports, $10,856,071. Exports of specie, $1,250,000.

Government bonds were quoted as follows:

U. S. 4½s, 1891, registered	103½
U. S. 4½s, 1891, coupon	104½
U. S. 4s, 1907, registered	122¾
U. S. 4s, 1907, coupon	122¾
U. S. currency 6s, 1895	116

The bank statement showed a loss in surplus reserve of $3,796,300, which reduces the amount held in excess of the 25 per cent. legal requirements to $3,700,850. All the items show a decrease except loans, which were further expanded by the sum of $362,100. Specie and legal tenders combined are down $4,489,100, and the deposit line is $2,611,200 less than the previous week. An improvement in the financial situation abroad was followed by the reduction of the Bank of England's rate on Thursday and a corresponding reduction by the Bank of Germany Money has continued fairly easy, the larger interior cities being well supplied. Bankers have been putting their money into the market a little more freely than for the two weeks preceding, and the commission houses, which have in many cases been carrying a large amount of time money, have placed it temporarily on call. In the market for time money there has been fair activity and a firm tone. Commercial paper was in good supply, but the demand was chiefly confined to out of town. Rates are 5 % for 60 to 90 day indorsed bills receivable, 5 to 5½ for four months' acceptances and 5½ @ 6½ for good single names.

Among the most cheering features is the favorable condition of the foreign commerce of the United States, as shown by the January returns. The total exports for the month were $78,867,403, and the imports $65,357,299—showing a favorable balance of $13,570,104, as compared with $7,000,000 for the same month last year. The balance of trade for the last seven months is $112,000,000 in favor of this country, against $54,000,000 for the same time the previous year. The common expectation that threatened changes in the tariff would hasten the landing of goods designed for the next season's trade thus far has not been realized.

In merchandise there is rather more activity. Clapp & Co. say of wheat. "Rumors of crop damage on fears of freezing, rains in California, drouth in Australia and freezing in Russia gave the trade more surprise last week than any time for 90 days. An advance of near 2¢ has been scored. Exports show slight gains." In coffee the temper of the market favors holders. Sugars are well sustained. The Spreckels refinery has produced as high as 2600 barrels per day. Cotton had another upward turn in values. A cable from Para says the present crop of rubber will be about 1000 tons below that of last year. The price quoted is equivalent to 75¢ ₱ lb landed in New York for Island. The jobbing trade both here and in other centers entered upon a more active stage in the week just closed.

Coal Market.

The Anthracite Coal market continues in the same anomalous condition as for some time past, prices being governed by "circumstances and conditions" rather than by any existing agreement among companies, tacit or otherwise. In this respect individuals and companies are much on the same basis. In a confidential way we may give the general run of actual sales about as follows—not intimating, however, that any one of the companies would countenance such a flagrant departure from the schedule as these figures might imply: Stove, $3.90 @ $4; Egg, $3.70 @ $3.80; Chestnut, $3.65 @ $3.75, all alongside. It may be added that sales by "individuals" are heard of as low as $3.25 for "Stock Coal," and Chestnut from Port Richmond has sold at $3. The term "stock" is understood to apply to inferior Coal for some time past in store—*i. e.*, not freshly mined. Steam sizes are scarce and prices decidedly firm on account of greatly shortened production and the activity of manufacturers. Pea is quoted $2.90 @ $3; Buckwheat, $2.40, alongside. Retailers buy only as they must, and after considerable shopping.

Shipments of Anthracite Coal for the week ending February 15, 1890, compared with the same period last year:

	1890.	1889.	Difference, Dec.
Wyoming	271,907	295,774	23,867
Lehigh	92,437	94,258	1,821
Schuylkill	118,274	146,158	57,884
Totals	482,618	536,190	53,572
Total for yr. to date	3,377,437	3,797,947	420,510

Bituminous Coal is quiet, with some considerable contracts already closed. The seaboard companies have formally agreed to revive last year's pool on the same basis—namely, $3.50 alongside in New York and $2.60, f.o.b., at other shipping points. Beech Creek remains outside. Cumberland shipments last week were 71,681 tons; Clearfield, 68,803 tons; Beech Creek, 49,000 tons; Pocahontas, 43,478 tons.

The Reading, Lehigh Valley and Lehigh Coal and Navigation companies have made the following prices at the mines for the city and line trade:

	New prices.	Old prices
Broken	$2.25	$2.35
Egg	2.25	2.35
Stove	2.40	2.60
Chestnut	2.15	2.40

Pea and Buckwheat were not changed.

There has been considerable cutting of prices, and the action of the three companies was taken with a view of meeting the lower rates.

R. J. Malone & Co., of New York, have been awarded the contract for driving a big tunnel through the Buck Mountain vein of the Park Place collieries.

Mine Inspector Blewitt, of the first Anthracite district, has completed the work of computing the output of Coal for the year 1889, the result being as follows: Delaware, Lackawanna and Western Company, 2,450,170 tons; Delaware and Hudson Canal Company, 2,246,308 tons; Pennsylvania Coal Company, 291,603 tons; Lackawanna Iron and Coal Company, 599,144 tons; William Connell & Co., 372,881 tons; Hillside Coal and Iron Company, 778,788 tons; miscellaneous companies, 1,856,055 tons; the total production being 8,594,949 tons, a decrease of 1,286,929 tons compared with the preceding year.

Metal Market.

Copper.—The London quotation at the time of our last week's report was £47. 10/ spot, and futures £48; this morning they are respectively cabled £47 and £47.15/, sales in the interval summing up 2250 tons. In our own market the consumptive demand is reported to be moderately active and steady, supplied by stray outside lots at 14¼¢, and the companies direct at 14½¢ while casting brands have ruled 12¾ @ 13¢.

Tin.—London cabled a week ago £90. 12/6 spot and £91. 10/ futures, and this morning respectively £89. 17/6 and £90. 15/, sales in the meantime summing up 900

tons. We have had an excited, very active week, with a drooping tendency, resulting in aggregate sales of 650 tons, including some very distant futures, and spot being 20⅝¢ to-day at the close. *Tin Plates.*—The little firmness in the English market noted a week ago has given way again. Fruit packers have made a few contracts, but the outlook for a good season is very discouraging, so much of last year's packing being carried over. The demand for Roofing Plates is fairly good on account of the open winter. Liverpool is nominally unchanged, with more desire to sell. We quote at the close, per box: Siemens-Martin Steel, Charcoal finish, $5.50 @ $6; Coke finish, $5.20 @ $5.25; Coke Tins, Penlan grade, $4.60 @ $4.65; J. B. grade, $4.80 @ $4.85, and Wasters, $4.50.

Lead.—Sales in the open market in this city figure up for the week 400 tons Common Domestic at 3.85¢, the quotation at the close being 3.85¢ @ 3.90¢, with the feeling a fairly strong one. Out West there is also considerable stiffness, 3.65¢ bid at St. Louis and 3.70¢ at Chicago.

Spelter—Has been flat and inactive at nominally 5.25¢ Common Domestic. Out West the quotation is 5¢ @ 5.10¢ at East St. Louis, to which 27¢ freight per 100 lb would have to be added to lay it down here. Silesian declined in London from £23. 5/ to £22. 10/, and may be nominally quoted 7¢ here.

Antimony—Has been but moderately dealt in at 28¢ @ 29¢ Cookson's and 20¢ Hallett's.

New York Metal Exchange.

The following sales are reported:

THURSDAY, February 20.

20 tons Tin, spot	20.80¢
25 tons Tin, March	20.20¢
(With seller's option of 25 more at 20.15¢, good until 1.30 p.m. on February 21.)	
25 tons Tin, March	20.10¢
(With seller's option of 25 more at 20.05¢, good until 1.30 p.m. on February 27.)	
25 tons Tin, March	20.10¢
(With seller's option of 25 more at 20.05¢, good until 1.30 p.m. on March 10.)	
10 tons Tin, April	20.00¢
(Seller's right to double.)	
25 tons Tin, May	20.10¢
20 tons Tin, March	20.25¢
10 tons Tin, April	20.25¢
10 tons Tin, May	20.25¢
10 tons Tin, June	20.25¢
10 tons Tin, July	20.25¢
10 tons Tin, August	20.25¢
25 tons Tin, September	20.20¢
25 tons Tin, October	20.20¢

FRIDAY, February 21.

10 tons Tin, March	20.00¢
16 tons Lead, February	3.85¢
25 tons Tin, November	20.05¢
35 tons Tin, December	20.05¢
110 tons Tin, April	20.00¢

MONDAY, February 24.

16 tons Lead, March	3.87½¢
20 tons Tin, April	20.05¢
10 tons Tin, May	20.05¢
100 tons Tin, April	19.95¢
40 tons Tin, March	20.10¢
10 tons Tin, March	20.12½¢
10 tons Tin, April	20.00¢
(Seller's option to double.)	
10 tons Tin, April	20.05¢
(Seller's option to double.)	
20 tons Tin, April	20.05¢
20 tons Tin, May	20.02½¢

Imports.

Hardware, Machinery, &c.

Barbour Bros., & Co., Mach'y, pgs., 11
Brandeis, L. & Co., Mach'y, cse., 1
Erhard, Geo. P., Hardware, pgs., 11
Folsom, H. & D. Arms Co., Mdse., cs., 3
Field, Alfred & Co., Arms, cs., 5; Chains, cks., 2; Shackles, cks., 3; Hardware, cs., 2; Mdse., 30
Graef Cutlery Co., Cutlery, cs., 7
Hartley & Graham, Arms, cs., 6; Mdse., cs., 17
Havemeyer & Elder, Mach'y, cs., 150
Lau, J. H. & Co., Mdse, cs., 15
Matthews, John, Mach'y, pgs., 13
Overton & Co., Mach'y, pgs., 10
Sacks & Richmond, Castings, cks., 7
Sellers, W. B., Mdse., cs., 3
Sheldon, G. W. & Co., Guns, cs., 22
Werlemann, H., Mdse, cs., 72
Wiebusch & Hilger, Mdse., cs., 66; Arms, cs., 25
Witte, John G. & Bro., Cutlery, cs., 7
Order—Mach'y, pgs., 6

British Iron and Metal Markets.

[*Special Cable Dispatch to The Iron Age.*]

LONDON, WEDNESDAY, February 26, 1890.

The Block Tin market has continued irregular and unsettled, recovering to £91. 2/6 after a sharp decline and settling back to £89. 17/6. Speculative holders seem to be thoroughly discouraged and little or no resistance has been offered to the movement to depress prices. America has been buying some Tin, but not sufficient to lend any support to the market.

Prices for Pig Iron warrants have fluctuated widely, but the amount of business done has been smaller the past week than for some months past. At this time there is a rather better feeling. There is only a fair business passing in makers' brands of Scotch, and prices for the same are rather easier. Cleveland warrants are somewhat stronger, owing to small stock in makers' hands and likelihood of a strike among the collieries. It is reported that Cumberland makers are considering a proposition to restrict production of Hematites, but speculation in this, as in other Pigs, is tame.

For Copper there has been more demand and purchases by consumers show some increase. A parcel of 400 tons Merchant Bars changed hands at £46. 12/6 and several smaller parcels at £46. 10/ @ £47. Speculative demand has improved and appears to be encouraged by the easier rates for money. The demand from consumers is improving, and prospects are considered favorable for a good Spring trade. It is understood the principal French holders have decided not to realize at less than £50, it being considered very likely that prices will recover, in view of the fact that North American supplies are small and that a good part of the French holdings will be wanted for consumption by present owners.

In Tin Plate business has been small, and Liverpool buyers are gradually tapering prices. The half-yearly meeting of the Plate-Workers Union was held Saturday, and 103 delegates, representing 72 works, were present. It was decided to cease work altogether during the second week in March, and every effort will be made to adhere to 36 boxes output in 8 hours until the stock at shipping ports shall have been reduced to 250,000 boxes. During the week previous to the meeting makers closed 70 mills, including those of the Baldwin, Williams, Conway Bros., Lewis, Thomas, Germant, Fairwood, Treforrest, Burry and Oldcastle companies.

Scotch Pig.—Business moderately active, but at rather lower prices for most brands:

No. 1 Coltness,	f.o.b.	Glasgow	75/
No. 1 Summerlee,	"	"	73/
No. 1 Gartsherrie,	"	"	73/
No. 1 Langloan,	"	"	72/
No. 1 Carnbroe,	"	"	54/6
No. 1 Shotts,	"	at Leith	75/
No. 1 Glengarnock,	"	Ardrossan	73/
No. 1 Dalmellington,	"	"	62/
No. 1 Eglinton,	"	"	55/

Steamer freights, Glasgow to New York, 2/; Liverpool to New York, 10/.

Cleveland Pig.—Transactions are as yet on a moderate scale, buyers and sellers being far apart. Makers quote at 58/ @ 60/, f.o.b., for No. 3 Middlesborough.

Bessemer Pig.—Makers' prices are modified somewhat, but still above buyers' ideas, and business is moderate. West Coast brands, mixed numbers, held at 80/, f.o.b. shipping point.

Spiegeleisen.—A brisk demand is still reported and makers are firm, quoting English 20 % 130/, f.o.b. at works.

Steel Rails.—There are offers at 2/6 decline on late prices, but only a moderate business passing. Heavy sections quoted at £7. 2/6 and light sections £7.15 @ £8, f.o.b. at N. W. England shipping point.

Steel Blooms.—Business fairly active at somewhat lower prices. We quote £6 17/6 for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—Prices are a shade lower and business fairly active at the decline. Bessemer, 2½ x 2½ inch, £6. 17/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—The demand for these has fallen off and prices are weaker. Bessemer, £6. 17/6, f.o.b. at N. W. England shipping point.

Old Rails.—The market continues dull and prices are nominal, with Tees held at £4. 2/6, and Double-Heads £4. 5/, f.o.b.

Scrap Iron.—No material change, the demand being moderate. Heavy Wrought quoted £3. 10/.

Crop Ends.—Moderate sales making at about previous figures. Bessemer quoted £3. 12/6, f.o.b.

Tin Plate.—Transactions moderate and prices barely steady. We quote, f.o.b. Liverpool:

IC Charcoal, Alloway grade	17/6 @ 18/
IC Bessemer Steel, Coke finish	16/3 @ —
IC Siemens " " "	16/6 @ —
IC Coke, B. V. grade	15/6 @ 15/9
Charcoal Terne, Dean grade	14/6 @ 15/

Manufactured Iron.—Demand smaller this week than last, but prices no lower except for Welsh Bars. We quote, f.o.b. Liverpool:

	£	s.	d.		£	s.	d.
Staff. Marked Bars	10	0	0	@	0	0	0
" Common "	9	0	0	@	9	5	0
Staff. Bl'k Sheet, singles	11	0	0	@	11	5	0
Welsh Bars (f.o.b. Wales)	7	12	6	@	0	0	0

Tin.—The market irregular and rather weak. Straits quoted at £89. 17/6, spot, and £90. 15/ for three months' futures.

Copper.—A fairly active business at slightly lower prices. Chili Bars quoted at £47. spot, and £47. 15/, three months' futures. Best Selected, £54.

Lead.—The market very quiet but prices steady. Quoted at £12. 17/6 for Soft Spanish.

Spelter.—Prices have remained firm and the demand is fair. Quoted at £22. 15/ for Ordinary Silesian.

Charles J. Harrah, the successful railway builder and for several years past connected with the Midvale Steel works, in Philadelphia, died in that city, 18th inst., at the age of 74. Up to within a few months of his death Mr. Harrah gave personal attention to the construction of modern cannon, and was ably assisted by his son, Charles H. Harrah, Jr, who is manager. For nearly 40 years Mr. Harrah was engaged in railway enterprises in Brazil and accumulated a large fortune.

MARKETS BY TELEGRAPH.

WEDNESDAY AFTERNOON.

Cincinnati.

The local market for Pig Iron is less dull, but the increase in business is at the expense of values. A few sales of moment have been made since Monday, among them being 1000 tons Gray Forge at $17 and 2200 tons No. 3 Foundry and Gray Forge at $16.50 @ $17, cash basis. There are still several thousand tons of Iron in second hands seeking buyers at about the basis of the sales above, which include Iron direct from the furnace. It is reported and confidently believed by buyers that the present combination of Southern furnaces to sustain prices will be broken within the next few days, and that concessions more or less liberal will be made, governed by the spirit of competition. Much interest is taken by the local trade in the formation of a new Pipe company, to be known as the Standard Pipe and Steel Company, in which Cincinnati capitalists, bankers and business men are interested. Piqua is reported to have been selected as the site for the new enterprise.

Cleveland.

The Pig Iron market is improving in many ways; No. 1 Foundry Iron is selling at $19.75 @ $20, cash, at the furnace; Charcoal Irons are gaining in favor; the Iron Ore market is also active. There are rumors of an advance of 75¢ ℔ ton in Coke, to take effect in March.

Pittsburgh.

There is a continued feeling of uncertainty in Iron and Steel circles, and there is not as much new business coming forward as hoped for. Large buyers are holding back to take advantage of the situation should prices go still lower. Pittsburgh manufacturers expect to obtain a good share of the orders for Iron and Steel and Glass that will be required for buildings at Chicago for the World's Fair, and with some good weather an improved demand is looked for from other sources. At a meeting of Steel manufacturers held yesterday a strong feeling was developed against any reduction in the duty on Steel Rails Rumors state that an effort is being made to have duty reduced from $17 to $10 ℔ ton.

Chicago.

The Pig Iron market continues about in the same condition as stated in my mail report, with perhaps some increase to be noted in sales. Consumers are certainly finding their contracts running out in numerous instances. Bar Iron is quite weak and past prices are now above the rates being made. Considerable business is in progress and much more is in sight, particularly for Car Iron Railroad purchasing agents say that an immense quantity of material will be needed this spring and summer, and that an early demand from that source is to be expected. Hence Bar mills are not inclined to load up far into the future at present prices. Old Iron Rails are quiet and are still quoted $25, Chicago. Valley mills are known to be short of stock and anxious to buy, but are waiting for a further decline. Near-by consumers are bidding only $25, but that is entirely too low. Old Steel Rails are active and firm. Car-Wheels are moving again to some extent at about $19.50. Both Cut and Wire Nails are dull, but prices are being generally sustained by manufacturers.

Foreign Markets.

EQUIVALENTS.

	Cents.
Franc, Peseta or Lira	19.3
Florin (Netherlands)	40.2
Florin (Austria)	35.9
Milreis (Portugal)	$1.08.
Milreis (Brazil)	54.6
Mark (Germany)	23.8
	Pounds
Kilogram	2.205
Qtcul	134.

BRAZIL.

PARA, February 18, 1890.—*India Rubber.*—The market is strong, with the stock on sale reduced to 75 tons. Receipts to date, 575 tons. Quotation for Island Fine, 2.450 reis. *Exchange*, 24¼d.—*Per cable direct.*

CHINA.

HONG KONG, January 14, 1890.—*Petroleum.*—On account of too heavy arrivals the market shows a downward tendency and prices declined. To-day's quotation for Comet Oil is $2.15½ @ $2.12½. The arrivals are 50,000 cases per W. H. Lincoln, and the sales 26,000 cases Russian to arrive from Batoum, per steamer Felbridge, at $1.95.—*Arnhold, Karberg & Co.*

SWEDEN.

STOCKHOLM, February 12, 1890.—*Iron.*—The official returns of the export of Iron Ore, Iron and Steel from Sweden in 1889 are now published in detail. They have been as follows, with the amount shipped in 1888 set against each: Iron Ore, 118,573 tons—117,350; Pig-Iron, 76,175 tons—49,095; Foundry Pig, 8530 tons—6459; Castings, 15,596 tons—14,586; Merchant Iron, 200,244 tons—187,775; Scrap Iron, 5924 tons—3033; Wire Rods, 4166 tons—1942; Sheet Iron, 5715 tons—5789; Nails, 2167 tons—2381; Machinery and Tools, 2,513,000 crowns of 28¢ American, against 2,417,000. Zinc Ore was, besides, shipped to the extent of 24,018 tons, against 25,817 in 1888, and of Copper only 73 tons, against 425 tons the previous year.—*Dagbladet.*

SPAIN

BILBAO, February 1, 1890.—*Iron Ore*—Only a few single cargoes were sold during the week. Superior Rubios at 8/6 @ 9/6, and Inferior at 8/ @ 8/6. There is for the moment no quotation for Campanil, the stock of which is reduced to a minimum, and mine owners asking higher prices than the foreign markets warrant. Shipments for the week amount to 103,068 tons. Steamers are waiting to be loaded of a joint capacity of 165,000 tons. Freights are weakening. *Pig Iron.*—Total export for the week 3595 tons. Since January 1 there have been exported 333,805 tons of Iron Ore, against same time last year 345,212, and 359,747 in 1888.—*Bilbao Maritimo y Comercial.*

BELGIUM.

BRUSSELS, February 15, 1890.—*Iron.*—Our market has been irregular, being at times somewhat unsettled by the fluctuations in England. Musson Foundry Pig has declined 50¢ ℔ 100 kg, and is now down to 8.50 francs ℔ 100 kg. No. 3. The foreign Iron and Steel movement in Belgium in 1889 has been as follows compared with the previous year:

	Importations.		Exportations.	
	1889.	1888.	1889.	1888.
	Tons.	Tons.	Tons.	Tons.
Iron Ore	1,035,210	1,746,984	157,327	148,310
Cast Steel	6,515	1,275	3,151	5,396
Steel Rails	1,099	250	67,979	63,030
Other Rolled Steel	3,520	2,510	30,660	24,886
Wro'ght Steel	1,318	886	8,395	4,012
Pig Iron	243,190	211,055	14,513	9,722
Scrap Iron	24,608	25,267	7,559	3,609
Iron Wire	3,149	3,232	4,841	3,751
Iron Rails	611	574	14,629	10,444
Sheet Iron	2,054	1,366	56,16›	44,786
Other Wro'g't Iron	11,264	8,165	257,352	250,717
Nails	600	551	13,820	13,278
Special Irons	3,694	3,517	37,227	24,168
Castings	2,204	938	28,165	21,199
Totals	1,389,436	2,006,470	707,8›3	630,328

—*Moniteur des Interêts Materiels.*

PROVIDENCE NOTES.

If the present plans of the Rhode Island Society for the Encouragement of Domestic Industry are crowned with success, the people of Rhode Island will next year be enabled to attend an industrial exhibition at Narragansett Park, where it is proposed to erect a fine machinery hall costing not less than $25,000.

The association is a long-established one, and has been among the most successful of its kind in New England. Elaborate preparations and displays have characterized its annual fairs, to which great gatherings have been drawn from all quarters. Domestic industries of every kind except manufactures have received substantial encouragement at these fairs, and now the society propose to arrange for a big exhibit of the manufactures of Rhode Island. There is no doubt that it will be vast in extent, for all phases of manufacturing are represented in this commonwealth. An auxiliary committee of citizens interested in the various manufactures will be appointed in a few weeks to canvass their respective classes, in order to ascertain whether the manufacturers will make a large enough display of their wares to warrant the erection of such a building, and also as to the size that will be necessary. The proposed new hall will be fitted with power and shafting, and lighted by electricity, and be in every way convenient and well appointed for the exhibitions, and a credit to the society and the State.

At the Crefeld Mills, Westerly, extensive alterations are being made in the internal fire apparatus. The old perforated pipe sprinklers have been taken down, and a double gang from the Providence Steam and Gas-pipe Company is at work putting up a system of automatic sprinklers. The main feed-pipe from the city pressure is of 5 inches in diameter, and the main runs in the building are of three and 4-inch pipe. To these and their attachments will be connected about 600 Grinnell sprinklers.

The average daily consumption of water in Providence during the year 1889 was 5,786,961 gallons. The total length of water-pipe laid during the year was 15,520.15 feet, or 2.94 miles. During the year ending December 31, 1889, there have been constructed about 1224 miles of pipe and 1059 miles of brick sewers, making a total of 2283 miles of sewers built, which, added to the length previously constructed, 6725 miles, makes a total length of sewers to date, 63,008 miles. Sixty catch-basins have been built, making the total to date, 2155.

LEONIDAS.

A charter was granted at Harrisburg last week to the Mutual Coke Company, of Pittsburgh, with a capital stock of $600,000. The directors are William P. De Armit, Wm. W. Jamison, Joseph S. Brown, Wm. C. Fownes and Henry C. Fownes. The new concern has purchased the property of the Mutual Mining and Manufacturing Company, at Mutual, Pa., consisting of about 200 coke ovens and 1000 acres of land, but as they did not purchase their stock it was necessary to take out a new charter.

According to one authority about $600,000,000 represents the amount of capital invested in electrical branches of industry in the United States, and upward of 50 per cent. of this enormous sum has been contributed within the past five years. At least half of the total is supposed to be represented by electric lighting companies. Besides, there are numerous machine shops, wire works, glass and rubber factories engaged in the manufacture of railroad implements and supplies and all kinds of apparatus.

Hardware.

The Hardware market continues to be without specially new features, there being very few changes in prices, and those for the most part comparatively unimportant. The volume of business is fair, but not especially large, the condition of the roads throughout the country having something to do with this, as well as the fact that many parties have not yet disposed of the goods purchased a few months ago. Manufacturers for the most part are busy on orders, and it is expected that before anything of a stock can be accumulated business will have set in to such an extent that they will not be disposed to make any concessions in prices in order to induce purchases. The travelers who are out are sending in a good many general assorted orders, in which the seasonable goods have a prominent place. There is more or less complaint in regard to collections, which are generally characterized as somewhat sluggish.

Cut Nails.

In spite of the fact that the volume of current business is very satisfactory the New York market is weaker, there being considerable competition for desirable orders. We quote Iron Cut Nails on dock in carload lots $2 to $2.05. For Nails from store $2.10 is occasionally shaded.

Wire Nails.

Since our last report the Wire Nail market has not gained in strength and somewhat lower figures than have recently been ruling are now quoted by several of the factories. The price at factory in carload lots may be named as ranging from $2.80 to $2.85, moderate advances being made for smaller lots. The demand for the goods is referred to as fair but not heavy.

Miscellaneous Prices.

The American Screw Company, Providence, R. I., under date February 18, announce the following advanced prices on Bay State Tire Bolts, Stove Bolts, Stove Rods and Sink Bolts:

Bay State Tire Bolts.....dis. 65 %
Stove Bolts.....60 %
Stove Rods.....60 %
Sink Bolts.....60 %

The same prices are announced by the Russell & Erwin Mfg. Company, New Britain, Conn., and New York, on Stove and Tire Bolts. The Portchester Bolt and Nut Company, Portchester, N. Y., also announce the following revised quotations:

Empire Tire Bolts.....dis. 65 %
Common Tire Bolts.....65 %

Wire continues strong in price and is held quite firmly by the manufacturers on a basis of discount 67½ per cent. for Market and Annealed in large lots. The price of Rods and Billets continuing high, the manufacturers are very firm in maintaining prices.

Notwithstanding some rumors to the contrary, the market for Strap and T Hinges and Wrought Butts continues firm and prices on the best goods are in general regularly maintained.

The Hog Ringers named "Top of the Hill," manufactured by the St. Louis Screw Company, St. Louis, Mo., are quoted at $4.25 per dozen.

The market for Clothes Wringers is regular in price, with a fair demand. The understanding between the different manufacturers in regard to price is referred to as carried out and working satisfactorily, the different quantity discounts giving the larger and smaller jobbers a reasonable profit. The ruling prices for the goods are, however, considered low, but there are no present indications of an advance, the slightly increased cost of Rubber not requiring this.

The recently advanced prices on Wrought Iron Pipe are maintained regularly by the manufacturers, who report also an excellent condition of business and a good supply of orders. There is, however, a tendency on the part of some jobbers to make slight concessions in the price, indicating that they have on hand a stock of the Pipe purchased at lower figures than those now ruling.

The fact that Rubber is a shade higher has only a very slight effect on the market for Rubber Goods, such as Belting, Hose, &c., the prices of which remain without alteration. The manufacturers of this line of goods are full of orders and some difficulty is experienced in turning out goods as fast as they are required by the trade. In this condition of things while quotations are unchanged the market may in a general way be characterized as slightly firmer.

Auburn Wringer Company, 3 Green street, Auburn, N. Y., issue descriptive circulars of Wringers of their manufacture, including the Warrior, Auburn and Surprise, of which illustrations are given. They also issue the usual trade price-list, goods being delivered free on board cars, Auburn, N. Y., terms 30 days, or 2 per cent. discount for cash in 10 days:

			Per dozen
Surprise,	No. 1,	Rolls 10 x 1¾ inches	$18.00
"	" 2,	" 11 x 1¾ "	20.00
"	" 3,	" 12 x 1¾ "	22.50
"	" 4,	Cog Wheel, Rolls 10 x 1¾ inches	20.00
Warrior,	No. 1,	Rolls 10 x 1¾ inches	16.75
Auburn,	" 1,	" 10 x 1¾ "	18.00
"	" 2,	" 11 x 1¾ "	20.00
"	" 3,	" 12 x 1¾ "	22.50
"	" 4,	" 14 x 1⅞ "	31.00
"	" 6,	" 16 x 2 "	38.00

Nason Mfg. Company, 71 Beekman street, New York, issue under date February 10 a new sheet of discounts, in which quotations are revised to correspond with the present ruling values.

The Akron Tool Company, Akron, Ohio, quote their Taft's Vise Wrench at discount 55 and 10 per cent., 60 days, less an additional 3 per cent. discount for cash in ten days, or 2 per cent. in 30 days.

A meeting of the Carriage Bolt manufacturers was held in this city last week, but no action was taken in the way of changing either discounts or rebates.

Lalance & Grosjean Mfg. Company, 19 Cliff street, New York, have issued under date February 15 a new catalogue and price-list in which 349 pages are devoted to their extensive line, among which many new articles recently added are shown. The list is accompanied by the following discount sheet, which indicates its arrangement and the prices at which the goods are quoted; terms, 60 days or 2 per cent. additional for cash in 10 days:

Pages.
17-34, Planished Ware.....dis. 70 %
44, Planished Brass Kettles:
7 to 17 inch inclusive, per pound..... net
18 to 20 inch inclusive, per pound. ...net
48, Copper Stock Pots, per pound.....net
46-47, Copper Saucepans, per pound..... net
43-49, All other goods in Brass and Copper Ware.....70 %
63-146, Agate Iron Ware.....33⅓ %
157-180, Blue and White Enameled Ware ...70 %
159-200, Wrought Iron Milk Cans.....70 %
278, Polished Deep-Lipped Fry Pans*.....70 %
279, The Central Fry Pans*.....70 %
275-281, All other goods in Polished and Bright Iron Ware.....70 %
283-321, Japanned Ware.....70 %
323-325, Kitchen Sinks, Laundry Tubs and Wash Bowls.....20 %
All goods in list marked with a * (except Fry Pans).....70 %
Everything else in list.....70 %

The Cordage market continues decidedly firm, as it is now controlled by the National Cordage Company, which includes all the manufacturers in the United States except those on the Pacific Coast. It is thus an easy matter to dictate prices, and with the present outlook it would not be surprising if prices were higher. The completeness of their control of the market results from the fact, which is not often found in such organizations, that they control the raw material, the production, and the figures at which the goods are sold.

The market for Tinware continues steady with only a moderate demand. For sometime there has been but little change in prices, which remain at their present rather low figure, owing to the animated competition between the manufacturers.

The action taken by the Western makers of Cut Nails in changing the card, as noted in our last issue, is variously regarded by the trade. It is recognized as desirable that the card should be so graded that a quotation may be given in a single base price without regard to the specifications, and it is thought that the new card will accomplish this. This is a matter that will be appreciated by the manufacturers of Nails and those who sell them in large lots, and will greatly facilitate the ease and convenience of quoting prices, but the change will probably be regarded by some retailers with disfavor on account of the confusion which results from what they consider an unnecessary revision of the card, necessitating on their part a great deal of explanation to consumers. The success which has attended the introduction of the present Wire Nail card, in using which it is no longer necessary for a seller of the goods to scrutinize the specification, has doubtless had much to do with the application of the same principle to Cut Nails. Many merchants will, however, doubtless find it desirable in selling Nails to consumers, who can hardly expect to be educated in the intricacies of these trade matters, to quote net prices on the different sizes and kinds of Nails, and not as is sometimes done by naming a base price to which extras are to be added.

Trade Topics.

An enterprising and successful Hardwareman of Vermont refers in the following terms to the discussion in regard to selling goods not carried in stock, and emphasizes the importance of this department of business:

I have read several of the articles relative to selling goods not carried in stock which have recently appeared in *The Iron Age*. I am not able to understand how any live Hardwareman can ignore the fact that selling goods not carried in stock is just as much a part of his business and just as legitimate as selling 10d. Nails. I have always done it, always expect to do it, and if I should stop—well, the idea of stopping is so closely allied with the idea of stopping business, that I had rather not entertain it. Some reader may say, if you have no stock you must sell goods that way or not sell them. I carry a $30,000 stock, strictly Hardware, and I make from one to a dozen sales of goods not in stock every day.

Referring to the same matter, a correspondent in Colorado writes:

We hardly see why there should be any question of advisability of doing business in this way. It has always been our practice to supply our customers with any goods in any way kindred to the line we carry, and very often go outside of our line where it does not interfere with the business of some other dealer. We can in this way often better serve a customer than if we carried the stock. For instance, our trade in belting is not sufficient to warrant our carrying a stock of quantity and size to meet a casual demand. We should either lose money in carrying a

dead stock, or to protect ourselves from loss charge a price higher than the customer should pay. We have always encouraged this kind of trade and know it pays directly, and more largely, we think, indirectly.

A correspondent in Indianapolis advises us as follows in regard to the Farmers' Alliance and the method by which the agreement between them and the merchants might be evaded:

In regard to the Farmers' Alliance I would like to give you my experience of how the old thing works. Along back in the seventies the writer was engaged as entry clerk in a wholesale house in Cincinnati. The Patrons of Husbandry sprung up in a section of country visited by our drummers. Their methods were the same as the Farmers' Alliance. The merchants of that section required all their invoices made out in duplicate with an average advance of about 10 per cent. on all articles except staples. The high-priced invoice was for the inspection of the Patrons of Husbandry. It made a little more work for the bill clerk but satisfied the customers. Think the present movement will result in something of the same kind as country merchants cannot afford to sell at 10 per cent. profit.

Items.

Simmons Hardware Company, St. Louis, Mo., have prepared for their customers convenient price cards relating to Carriage, Tire, Stove and Plow Bolts, and also to the leading kinds of Screws. These cards are intended for store use, and have printed upon them the sizes and list prices of the different goods, with blank columns for marking the cost and selling prices. These cards will doubtless be appreciated by those who receive them and will be found very convenient for the purpose for which they are intended.

A. F. Seeberger, senior partner in the well-known Hardware house of A. F. Seeberger & Co., Chicago, retired on the 19th inst. from the office of Collector of Customs for the port of Chicago, which he has held for over four years. Mr. Seeberger established for himself a high reputation as a most efficient officer. The employees of the Custom House presented him with a valuable gold-headed cane as a token of their esteem.

A decision has been rendered by Judge Wallace, of the United States Circuit Court for the Northern District, of New York, in the suit of the Hiram Holt Company, East Wilton, Me., *vs.* D. Wadsworth & Son, Auburn, N. Y., for infringing the trade-mark "Lightning." The substance of the decision is as follows: It is held that the complainants have a valid trade-mark in the word "Lightning," as applied to Hay Knives, similar to those to which they have applied them, and that the trade-mark is valid, both at common law and by the Act of Congress of March 3, 1881, that the word is not merely descriptive of the quality or characteristics of the article to which it has been applied, and that they should have a decree for an injunction to restrain the defendants from violating their mark in the word, and have an accounting.

A recent issue of the St. Louis Daily *Globe Democrat* contains illustrations of some of the principal business houses in Paducah, Ky. Among these we observe one of the Hardware and Stove store of Geo. O. Hart & Son.

Horace F. Sise, 114 Chambers street, New York, announces to his friends in the trade that he is still general agent for the Barnes Mfg. Company, which will be run under the management of the receiver, M. C. Kellogg, and all orders for their goods sent to him at the above address will receive prompt attention as heretofore. Mr. Sise is also the Western representative of the Graham Mfg. Company, successors to G. M. Hotchkiss & Co., manufacturers of Keys, Blanks, &c.

We are advised that the impression prevails in some quarters that the Ironclad Mfg. Company are making Cast Iron Hollow-ware. This, however, is a mistake, their new line of goods being Enameled-Ware similar to the Agate and Granite-Ware with which the trade are familiar.

Sargent & Co., New York and New Haven, Conn., have issued new pages 1091 and 1106 to be added to their catalogue of 1888. These pages relate principally to goods which they have for some time been selling, but which have not heretofore been represented in their catalogue. Among them Stanley Rules, Bevels, Gauges, &c.; Bailey's Planes, Chesterman's Tapes, Mrs. Potts' Sad Irons and Curry Combs may be mentioned.

Slaymaker, Barry & Co., Lancaster, Pa., whose new Scandinavian Padlock is illustrated on page 357, are intending in the near future to make a general line of new articles in Shelf Hardware, and shall be pleased to negotiate with any parties who desire to have Hardware articles manufactured.

The Southern Railway and Steamship Association have issued a revised classification which goes into effect March 1. A number of changes in existing rates are made.

Avery Stamping Company, Cleveland, Ohio, issue an illustrated sheet of prices of their Seamless Steel Elevator Buckets and Conveyor Boxes, which shows the large variety made and calls attention to their special features. The point is made that the Buckets pack so closely together that they are rated as fourth-class freight, while other makes, which are riveted, soldered or double seamed, are rated first class.

Hocking Valley Mfg. Company, Lancaster, Ohio, issue a catalogue giving descriptions and illustrations of the complete line of Agricultural Implements manufactured by them. They refer to the fact that without having made special efforts to secure business, they have run a full force full time the year round, there not having been one month of the time for the past five years that they were even with their orders. They allude also to the advantages of their location, situated as they are in a wooded country, where lumber is of prime quality and cheap, with abundant supply of natural gas and unexcelled shipping facilities. The catalogue is a well-printed pamphlet of 72 pages and illustrates satisfactorily their well-known line of Implements.

Heinz & Munschauer, Buffalo, N. Y., have issued their catalogue for 1890. They refer in the opening circular to the trade to the fact that they have been in business over a quarter of a century and courteously acknowledge the appreciation shown to their manufactures. They call special attention to their hardwood Refrigerators, of which they make a full line, of dry oak lumber, trimmed in bronze and finished with their patent system of ventilation. The catalogue also illustrates their extensive assortment of Brass and Japanned Cages.

Cambridge Roofing Company, Cambridge, Ohio, have issued their eighth annual catalogue, describing their line of Roofing, corrugated and beaded, Iron Siding and Ceilings, &c., in which copious illustrations are given, showing the special features of their manufactures. During the past year they have been obliged to greatly enlarge their works and put in new machinery in order to meet the demand for the goods. The information given in the catalogue in regard to the uses of Iron and Steel for building purposes will be serviceable to many in the trade.

We are advised by Dame, Stoddard & Kendall, Boston, Mass., that they are the sole selling agents for Thomas H. Chubb's Fishing Rods and Fly Hooks for the coming season.

Grant C. McNeil, Akron, Ohio, issues a circular illustrating his line of Tubular Steel Barrows, including Dirt, Mining, Foundry, Brick, Coal, Mill and Pig Iron Barrows, and also his Two-wheel Barrow. The dimensions of these Barrows and other points in regard to them are given.

The Ellrich Hardware Mfg. Co., Plantsville, Conn., have arranged with S. P. & H. W. Smith, 109 California street, San Francisco, Cal., to represent them in the sale of their specialties on the Pacific Coast.

H. Rosekrans & Co., 638 Market street, San Francisco, announce that they will remove May 1 to their new store, No. 511 Sixth street. This house, we are advised, was established in 1849, and they are desirous of obtaining agencies for good Tools and Shelf Hardware.

The firm of Palmer Bros., Savannah, Ga., who succeeded Palmer & Dappish some years ago, and who have been long and favorably known as one of the leading jobbing houses of that city, have made arrangements to incorporate their business as a stock company under the name of Palmer Hardware Company. This new arrangement will go into effect March 1. The business will be carried on practically as heretofore under the same management. The officers of the company are: President, S. B. Palmer; vice-president, H. A. Palmer, and treasurer, H. W. Palmer. Their New York office will continue to be at 100 Chambers street, and they will be pleased to receive catalogues or quotations at either address.

The Paige Brothers Company, Akron, Ohio, who last April succeeded Paige Brothers, are preparing to extend their business and engage in the jobbing of hardware and manufacturers' supplies in addition to their old established retail business in General Hardware. The officers of the company are as follows: A. T. Paige, president; J. Ed. Good, vice-president and secretary; F. W. Beebe, treasurer; Theodore Butler, general manager and G. S. Scott, assistant manager. Both Mr. Good and Mr. Butler were with McIntosh, Huntington & Co., of Cleveland, for many years in responsible positions. The company is regarded as entered upon their enlarged enterprise under very favorable auspices.

James Kilbourne and the Kilbourne & Jacobs M'f'g Co., Columbus, Ohio, are sending out a joint notice to the trade in which they warn the trade against infringements of their patent, No. 240,146, for improvements in Sinks, and state that suit has been brought against some parties who are alleged to have infringed their patent.

Geo. F. Eberhard, formerly of the Eberhard Mfg. Company, Cleveland, Ohio, has we are advised located permanently on the Pacific Coast, having taken charge as manager of San Francisco office of a number of Eastern manufacturing interests selling strictly to the jobbing trade. We learn that Mr Eberhard keeps a traveling salesman beside himself, thus covering the entire Pacific Slope.

Hall & Willis Hardware Company, Kansas City, Mo., have issued a 36-page price current, devoted principally to seasonable goods. A prominent place is given to the Iowa Farming Tool Com-

pany's Steel Goods, New Perfection Refrigerators, White Mountain Freezers and Golden Clipper Screen Wire Cloth. Wadsworth's Scythes, Lawn Mowers, Curry Combs, Shovels and Spades, Wheelbarrows, &c., are also represented.

E. C. Meacham Arms Co., St. Louis, Mo., under date February 17, send out a 50-page trade circular, on the first page of which L. C. Smith's Double Cross Bolted Hammer Gun is illustrated. An extensive variety of Arms is shown, together with information in regard to other goods, such as Bicycles, Pocket Cutlery, Ammunition, Boxing Gloves and other specialties.

The Bindley Hardware Company, of Pittsburgh, one of the oldest Hardware concerns in that city, has been granted a charter with a capital stock of $300,000, and the following officers have been elected: John Bindley, president; W. C. Reitz, secretary and W. H. Cochrane, treasurer. The firm will shortly commence the erecting of a warehouse on Seventh avenue, just across the street from their present location, which will measure 100 feet front and 90 feet deep. It will be six stories in hight and will be one of the most complete buildings in every respect in the country.

During the past few years a number of new Hose Reels for lawn and garden use have been put on the market, and still others will be offered to the trade for the first time the present season. In connection with the large increase in the use of Lawn Mowers there is also a large increase in the demand for Hose Reels, a line of goods which are coming into much more general use in nearly all parts of the country. The variety already on the market is large, but the ingenuity of inventors and manufacturers is devising others, some of which are quite different from those with which the trade are familiar.

J. P. Lindemann & Sons, 827, 829, 831 and 901 St. Paul avenue, Milwaukee, Wis., have just issued a 48-page catalogue and price-list of Pieced Tinware, Sheet-Iron Goods and Vapor and Gas Stoves. The first 28 pages are devoted to Pieced Tinware and Copperware, embracing Tea-Kettles, Coffee and Tea Pots, Pails, Basins, Cups, &c., in great variety. A large part of this line is newly designed by the manufacturers, Messrs. Lindemann & Sons. Three pages are used in describing Sheet-Iron Goods, such as Elbows in one, four or five pieces, fixed or adjustable, also Dripping Pans and Patent Stove Pipe. The remainder of the catalogue is given up to Gasoline, Gas and Oil Stoves. The Gasoline Stoves are named Cardinal, and consist of plain high Stoves, extension or step Stoves, steel plate cabinet Stoves and juniors. The Gas Stoves are also named the Cardinal line, and consist of plain high Stoves, small plain Stoves, cabinet Stoves, and cabinets with extensions. The Oil Stoves include Lamps and Ranges, the Home Range being shown with a full line of Stove Furniture. The catalogue is very excellently illustrated and handsomely printed.

The Nubian Iron Enamel Company, of Chicago, report their trade for 1890 to be far in excess of that of 1889, although the latter was the best year they ever had. Their Quick Drying Nubian seems to have a strong hold on the trade, as commendatory letters concerning it are constantly being received by the company.

Bliss, Bullard & Gormley, 78 and 80 Randolph street, Chicago, have purchased the stock of Builders' Hardware at 112 Randolph street, from Mrs. John R. Scott, who has decided to close out her deceased husband's business. The entire stock will be removed to the store of the purchasers. The business of Bliss, Bullard & Gormley has shown a very gratifying increase in their new quarters and they now are able to compare their business most favorably with that of the old firm of Kellogg, Johnson & Bliss, whom they succeeded. They have completely recovered from the interruption to their business by the fire which drove them from their old stand, and are making many improvements in various directions. The new store will shortly be made the subject of an article in our columns. It is very conveniently arranged and embodies many original ideas.

On March 1 next the Braddock Wire Company, of Rankin Station, Pa., will open offices in the Lewis block, Pittsburgh, which will be the headquarters of their sales department. The firm have found it necessary to do this on account of their growing business and their anticipated still further growth when they get their Wire Nail factory in operation, which will be about May next.

Miller & Magee, Lehigh avenue and Lawrence street, Philadelphia, have recently completed and occupied in connection with their present stand the new building adjoining. They now have one of the largest and best equipped Hardware stores in that growing section of the city.

Carriage Hardware.

The following are the revised prices adopted by the National Association of Carriage Hardware Manufacturers. They are subject to the quantity rebates which have been determined upon. Terms, net cash, 30 days:

Fifth Wheels.

	No.	9-16 & 5-8	¾	⅞	1	1⅛	1¼	Dis. per cent.
Derby	1	$14.50	$16.50	$28.00	$40.00	$46.00	$60.00	
"	2	14.00	16.00	27.00	38.00	44.00	58.00	
Cincinnati	3	11.00	13.00	21.00	33.00	41.00	55.00	
Ohio	4	11.00	13.00	21.00	33.00	41.00	54.00	
"	4½	15.00	17.00	27.00	.....	.....	.....	
Larkins	5	23.00	25.00	34.00	.....	.....	.....	
"	6	21.00	23.00	32.00	.....	.....	.....	45&5
"	7	19.00	21.00	30.00	.....	.....	.....	
Derby	8	18.00	20.00	31.00	.....	.....	.....	
Cincinnati	8	15.00	17.00	25.00	.....	.....	.....	
Derby	9	14.50	16.50	28.00	40.00	46.00	60.00	
"	9½	14.00	16.00	27.00	38.00	44.00	58.00	
Cincinnati	14	10.00	12.00	20.00	.....	.....	...	
"	15	10.50	12.50	21.00	.....	.....	...	
Brewster	11	26.00	30.00	.....	.....	.....	.....	
"	11½	26.00	30.00	.....	.....	.....	.....	50&5
"	12	29 00	33.00	50.00	.....	.....	...	
" Cin. Lug	12½	18.00	20.00	.....	.....	.....	....	

	9-16 & ⅝	¾	⅞	1	1⅛	1¼	
Full Circles, Nos. 13, 14, 15 or 16 inch diameter, Half-Round Iron, Plain Tops	$25.00	27.00	39.00	42.00	48.00	58.00	45&5
Ditto, Derby Tops	.....	29.00	43.00	48.00	54.00	64.00	
		1	1⅛	1¼	1⅜	1½	
Full Circles, Nos. 13, 14, 15 or 16 inch diameter, Flat Plain Tops		$38.00	46.00	48.00	54.00	58.00	
Ditto, Derby Tops		40.00	50.00	54.00	62.00	68.00	45&5

Ohio Bottom Fifth Wheels, Scroll Tops, $9 per dozen for ⅝; $11 for ¾.
Derby Wheels, Long Spot, or 3 Spot, Scroll, Top Ohio Bottom, $14 per dozen for ⅝ and 11-16, $16 for ¾.
Special Scroll Fronts on Bottom Wheels, 25 cents per dozen extra, net.
Ohio Bottom Wheels, ⅝, $3; ¾, $4; ⅞, $6, per dozen pairs net.
No charge for Extra Squares on ⅝, ¾, 12, 13 and 14 inch Cincinnati, Ohio or Brewster Fifth Wheels, nor on 14 x ⅞ inch Cincinnati. On all other kinds 50 cents per dozen extra, for extra square on ⅝ and ¾, 75 cents per dozen extra on ⅞, $1 per dozen extra on 1 inch Fifth Wheels.
Long Extra Squares $1 extra for ⅝ and ¾, $1.25 for ⅞, $1.50 for 1 inch, per doz. } Net.
Wheels with rod to Axle-bed, $2 per dozen extra. Brewster Wheels, with Derby Top, $2 per dozen extra.
Deduct for Black Brewster Wheels, $1 per dozen net.
The regular length of flat part of Clip is 2 inches for 9-16, ¾ and 11-16; 2¼ for ¾; 2½ for ⅞; 3 inch for 1 inch; 3¼ for 1⅛; 3½ for 1¼; 3¾ for 1⅜; 4 inch for 1½ iron; 25 cents per dozen extra for each ¼ inch variation from regular length of Clips.

Full Round End Norway Axle Clips, ¼ and 5-16, standard Norway list ..... 55, 5&5
" " " " " ⅜, " " " ..... 50, 10&5
" " " Spring Bar Clips, 5-16, " " " ..... 60, 5&5
Second Grade Norway Axle Clips, ¼ and 5-16, " " " ..... 65&5
" " " " " ⅜, " " " ..... 55, 5&5
Superior Axle Clips, 5-16 and ⅜ ..... 66⅔&5

New superior list adopted November 18, 1885, as follows:

Nos. 00, 0, 1, 70¢; No. 2, 75¢; No. 3, 80¢; No. 4, 95¢; No. 5, $1.10; No. 6, $1.25—5-16 shank.
No. 0, 4 in. flat, $1; No. 1, 4½ in. flat, $1.15; No. 2, 5 in. flat, $1.30; No. 3, 5½ in. flat, $1.45; No. 4, 6 in. flat, $1.60; No. 5, 6½ in. flat, $1.75; No. 6, 7 in. flat, $2; No. 7, 7½ in. flat, $2.25—⅜ shank.
Brewster, or 1 long shank, No. 1, 90¢; No. 2, 90¢; No. 3, $1; No. 4, $1.10; Timken, or 2 long shanks, No. 00, $1; No. 0, $1; No. 1, $1; No. 2, $1.10; No. 3, $1.20.
Same discount as other Norway Axle Clips of the same grade.

	Per dozen sets.	
3 piece Buggy Saddle Clips and Plates, 1½ spring and under	$1.50	
3 " " " " no Plates, " "	1.30	
2 " " " " and Plates, " "	1.30	
3 " " " " " " 1¾ spring, ⅝ shank	2.70	
3 " " " " no Plates, " "	2.35	5
Short Spring Clips, Plain Half Round, 5-16, per single dozen	.65	
" " " " " ⅜, " "	.90	
" " " " Fancy, 5-16, "	.75	
" " " " ⅜ "	1.00	
Shaft Couplings, unfinished		60&5
Pole " "		55&5
Finished Shaft Couplings, ⅞ inch and 1 inch light, $3.75; 1 inch heavy, $4; 1⅛, $5, 1¼, $6; 1½, $8.		
Finished Pole Couplings, ⅞ and 1 inch light, $4.25; 1 inch heavy, $4.60; 1⅛, $5.60; 1¼, $6.70; 1½, $8.70		5
Coupling Parts—Clip Part, ⅞ and 1 inch light and 1 inch heavy, $2.65 per dozen pairs		
Coupling Parts—Sizes larger than 1 inch heavy		45&5
Shaft and Pole Eyes		70&5
Milled Coupling Bolts, Refined, $2.25 per 100 (7-16 and under)		5
" " " Norway, $2.50 per 100 " "		5
Sleigh Couplings, complete, $3.25 per dozen pairs		5
Sleigh Coupling Clips, $1.60 per dozen pairs		5
½ and 9-16 Oval and 7-16 Round Long Joint Ends, $0.26		
⅝ " " ½ " " " " " .28		
¾ " " " " " " " .38		
9-16 Extension " " " " .39		5
⅝ " " " " " .42		
¾ " " " " " .57		

Nos.	1.	2.	3.	4.	
Plain King Bolts	$1.70	$1.70	$2.20	$3.30	
Flange "	2.25	2.25	2.75	4.00	5
Flanged Finished King Bolts	2.55	2.55	3.05	4.30	
Plain " "	2.00	2.00	2.50	3.60	

King Bolt Yokes and Braces, light, per doz., Plain or Swedged, $2 5
" " " " " heavy, " " " $2.50 5
" " collar pattern, per doz., $1.00 5
" " " " nutted and threaded, per doz., $1.30 5

	Dis. per cent.
Stump Joints, No. 1	30&5
" " No. 2	35&5
" " No. 3	45&5
Welded Joints, black, 9-16 inch, per set, 75¢	5
" " " ⅝ inch, per set, 85¢	5
" " bright, ⅜ inch, " $1	5
" " " 9-16 inch " 90¢	5
One Lip Body Loops, ¾ and 1 inch, per doz., 95¢	5
" " " 1⅛ inch, per doz, $1.10	5
" " " finished, 5-16 inch, 5-inch drop, 75¢; 5¾-inch drop, 90¢; 6¾-inch drop, $1 per set (4 pieces)	Net.
Two Lipped Body Loops, ¾, ⅞ and 1 inch, $1.80; 1⅛ and 1¼ inch, $2	25&5
Single Perch Plates, $7.50 per doz.	40&5
Double " " $7.50 "	35&5

Norway Step Pads.	Nos. 0 and 1	2	3	4	5	6	
Fancy patterns	$3.80	4.10	5.25	6.40	8.80	11.75	
Plain	2.65	2.90	4.10	5.25	7.60	...	
Refined Step Pads.							
Fancy patterns	2.90	3.20	4.50	5.75	.	....	
Plain	2.25	2.60	3.85	5.20	....	....	5&5
Round Step Pads, inches	3¼	4	4½	5	6	....	
Norway, fancy			$4 70	5.50	9.40	...	
" plain	$2.65	2.90	4.10	5.00	....	...	
Refined, fancy	2.35	3.20	3.80	4.70	....	....	
" plain	2.05	2.35	3.50	4.40	...	.	

Finished Steps.	Nos. 1.	2.	3.	
Timken Side Bar, Plain Pads	$0.50	$0.55	$0.70	per pair.
" " " Fancy "	.55	.60	.75	"
Brewster Body, Plain "	.65	.70	.80	"
" " Fancy "	.70	.75	.85	"
End Spring, " "	.70	.75	.85	"
Phaeton Spring, " "	....	.75	.85	"
" 4½ inch, Round, 75 cents; 5 inch, Round, 85 cents per pair.				
Surrey Body, Fancy Pads, No. 3, 95 cents; No. 4, $1.05; No. 5, $1.20 per pair.				
" " with Offset Brace, No. 3, $1.50; No. 4, $1.60 per pair.				

5

N. B.—Extra lengths of Shank over 4 inches on No. 1 and No. 2 Step Pads, 20 cents per inch, and extra lengths on No. 3 and No. 4, 25 cents per inch	Net.
Slat Iron, New York Pattern, all kinds	45&5
" Philadelphia "	60&5
" " " Extension	55&5

Terms: Net cash 30 days F.o.b. at factory depot.
Positively no freight allowances.

REVIEW OF THE WHOLESALE MARKET IN PAINTS AND OILS.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

Paints and Colors.

Few changes have taken place the past week and those few have been of insignificant character. Local demands have continued remarkably good for the season, orders received by mail have ran rather above the average, as a rule, and manufacturers and jobbers alike appear well satisfied with the general result for the week and with the February record also. The distribution, it may be added, has not been confined to any particular class of goods, the more staple commodities and proprietary articles having alike experienced rather freer movement than usual at this season, although orders run chiefly on moderate quantities that may be needed to tide over immediate wants. Prices have fairly firm support all along the line, the general tone is good and prospects are very encouraging for the spring season movement.

White Lead, &c.—There has been no striking change in the White Lead market the past week. Corroders state that the movement of the pure article is still satisfactory and rather larger now than at the corresponding period last year. Jobbers seem to be doing a better business also. Inferior descriptions of Lead are going into the channels of consumption in gradually increasing amount, and the best of those mixtures, it is claimed, are giving satisfaction. Prices throughout remain the same as quoted last week, and the market appears quite firm.

Red Lead and Litharge are without change as to prices, and the demand for the pigments is of routine character, but involving quite as much supply as usual at this season.

Zincs.—The jobbing distribution of American Oxide has continued very satisfactory, and movement during the month has to all accounts been above the February average. Manufacturers, as a matter of course, find the situation satisfactory, their deliveries being well taken up, and prices are firmly held. Foreign Zincs are firm at previous prices and meeting with very fair sale

Colors.—House painters' Colors have had quite good movement, with purchases more conspicuous in point of involving assortments rather than any particular shades. Grinders' Colors have continued to move in a satisfactory manner also. Prices are showing no radical change.

Ready Mixed Paints continue to sell in remarkably good quantities, and the present run of demand indicates that the goods are being taken in the place of White Lead and Linseed Oil to an increased extent, owing to the high cost of the latter.

Miscellaneous.—Block Chalk remains quite firm, being in limited supply on the spot. Whiting is freely offered at previous prices and Paris White is fairly firm.

Animal and Vegetable Oils.

In this branch of trade business has been rather slow and somewhat disappointing. A weakish sort of feeling appears to have crept into the Cotton-Oil branch, with more or less effect upon some other goods, and that, along with irregularity on Lard Oil and lower rates for several minor greases, has a tendency to check business, temporarily at least. Linseed Oil, on the other hand, is so high that the utmost economy in its use is practiced by most consumers. Olive Oil is in a similar position. Upon the whole, the existing conditions are something of a drawback to free or confident trade, yet the general distribution is good and involving nearly as much stock as when the surroundings are more favorable.

Linseed Oil.—City crushers, prices remain at 61¢ for domestic and 63¢ for Calcutta seed raw Oil. High cost is doubtless checking purchases and prompting the use of substitutes and adulterants to an increased extent. The present high prices for Oil are due almost wholly to the cost of seed, and the appearance of the market for the raw material is nowise encouraging for modified cost. Hence manufacturers are content that orders should run light at present, they calculating that the spring demand is certain to witness a further advance in prices.

Cotton-Seed Oils.—The market is a shade weaker. Orders for the refined products for export have fallen off and the home requirements of crude seem to be smaller also. Meanwhile there seems to be an abundance of Oil and not a great deal of backbone among the holders. On actual sale prices are about ½¢ lower than they were a week ago.

Lard Oil.—There has been little change. For ordinary-sized lots of prime, prompt delivery, 52¢ is the general price, but orders of liberal size are yet filled at 51¢ for city-made Oil, while outside product is secured at 50¢. There has been little change in the condition of the market for raw material.

Fish Oils—There has not been the slightest change in the market for anything in this line. The crude oils are having limited demand and the manufactured products are selling in a jobbing way only. Prices show no change, and the prospects are that none of importance is likely to take place.

Olive Oil—Italian Olive Oil in barrels is up to 90¢ @ 92½¢, with only limited quantities obtainable at the inside figures. Cost has further increased in the foreign market, and supplies here are light.

Cocoanut Oil—Cochin Oil is offered now at 5¼¢ on the spot and Ceylon may be had at 5⅛¢. The demand is slow and the tone of the market rather weak.

An Inventor Protected.—Justice Lawrence, of the Supreme Court, rendered a decision on Monday setting aside a verdict of $200,000 given by the jury in the suit of William Pitt against Charles Kellogg tried before him on January 24. Pitt is a broker and Kellogg an inventor who held five patents upon seamless steel tubes. Pitt undertook to organize a syndicate to utilize the patents, for a compensation of $200,000, and went to Philadelphia, where he interested a number of capitalists, among them Messrs. Garrett, Sloan and Hill. Only four of the patents were exhibited. An adjournment was taken to permit Kellogg to produce the fifth model, which, it was stated, was the principal one. Pitt claimed that instead of carrying out the arrangement Kellogg placed his invention with a Boston syndicate capitalized at $2,000,000. Pitt then sued and recovered the $200,000 as damages, whereupon Kellogg moved to set aside the verdict as against the weight of evidence. In granting the motion Justice Lawrence says the plaintiff failed to show that he had completed his arrangements for the organization of the company, and that the award of damages was grossly excessive.

The Raymond Lead Company, whose office and factory are located at Lake and Clinton streets, Chicago, have added to their establishment what they term a mixed metal department. Frank P. Cargill is manager of this department. They propose to manufacture a full line of babbitt, electrotype and stereotype metals. Any special mixture will be made to order and packed in 50 pound, 100 pound, 200 pound and 500 pound boxes, as required. For machinery bearings of all kinds they will manufacture aluminum copper-mixed anti-friction metal. For railroad journal bearings they will manufacture Cargill's anti-friction metal. A neat little pamphlet is issued on this subject by the Raymond Lead Company, which sets forth the character of the mixed metals which they now propose to manufacture, together with details of interest to buyers or consumers.

The Easton Industrial Association has issued a handsomely illustrated pamphlet entitled "The Forks of the Delaware," descriptive of the resources, industries and history of Easton, South Easton and Phillipsburg.

Governmental Control of the Railroads.

A REMARKABLE DOCUMENT ISSUED BY A RAILROAD PRESIDENT.

The first move toward selling the railways of the United States to the National Government has been made. The initial step has been taken by President T. B. Blackstone, of the Chicago and Alton road, who suggests that the National Government shall acquire the ownership of all the railroads in the United States which are now used for interstate traffic. A year ago, in his annual report to the stockholders of the Alton road, Mr. Blackstone made a clear, concise, interesting and valuable statement regarding the many difficulties the railways encountered because of excessive competition, lax management on the part of the weaker lines, and an unlimited yet tryingly varied and conflicting legislation on the part of Congress and the various individual States. That statement of facts and views created quite a sensation all over this country, but the statement appended by Mr. Blackstone in the 27th annual report, just submitted to the stockholders, eclipses that of a year ago completely. When Mr. Blackstone was in Europe a few months ago the sensation mongers sold the Alton road to a great number of purchasers with amazing freedom and disregard of truth. All that time Mr. Blackstone was visiting in England, France and Germany, studying the systems in those three countries. The results of his observations are embodied in this report. In England there is but little conflict among the roads; in Germany and France the railways are controlled by the Government, thus preventing all friction.

After exhibiting a financial statement for the year 1889 as compared with 1888, showing a very satisfactory condition of affairs from a stockholder's standpoint and insuring a continuance of dividend paying, Mr. Blackstone proceeds as follows:

The policy of the State and National Governments in the matter of constructing and operating railroads, to which we have before called your attention, has been continued since the date of our last annual report substantially unchanged.

The principal agencies employed by the States for the last 20 years are railroad commissioners, who are required from time to time to fix reduced maximum rates, and speculating contractors, who have been, and are now, authorized to construct railroads where they are not needed, and where such roads cannot possibly obtain traffic enough to support them. The object of the Government appears to be to divide traffic between the older lines and those more recently constructed, and by the resulting excessive competition to reduce rates for transportation.

The building of such railroads has caused the loss of many millions of dollars of capital invested by the shareholders of the older railroads, which were built when and where they were needed by the people and not for speculative purposes.

The remarkable course which the Government has pursued in causing competing railroads to be constructed, and by imposing what appears to us to be, in some cases, unnecessary restrictions upon railway managers, cannot be too often referred to while it remains unchanged. We believe the people have pursued a mistaken policy, and that without much consideration as to the ultimate effect of their course they have been led on step by step until great injustice has been done and is now being done in their name. We believe also that the people are manly enough to consider what we may say in the friendly spirit in which it is offered, although the record to which we may call their attention is not in all respects such as we can refer to with pleasure.

Mr. Blackstone here cites the railway history of Illinois, showing how the State was bankrupt after attempting to construct 1300 miles of road, and how it finally entered into contract with several railroad corporations for the construction of such roads as were needed for its development.

Next comes a history of legislative acts affecting railways in this State, and comments adverse to many decisions of the Supreme Court. Mr. Blackstone continues:

The practical effect of the Supreme Court decisions to which we have referred is to place all railroad corporations at the mercy of Legislatures, or, as one of the Justices of the Supreme Court of the United States has said, "subject to legislative caprice."

Excluding street railroads, and other railroads of less than ten miles in length which are not operated as part of a system, we find that only 83 of the 650 corporations operating railroads were able in 1888 to pay dividends to their shareholders.

Nine corporations, operating 1192 miles, paid 10 per cent dividends; 7 corporations, operating 2247 miles, paid 8 per cent. dividends; 14 corporations, operating 8141 miles, paid 7 per cent. dividends; 24 corporations, operating 13,644 miles, paid 6 per cent. dividends; 10 corporations, operating 6973 miles, paid 5 per cent. dividends.

Then follows a statement which is startling in the extreme:

The remaining 19 of the railroads which earned dividends paid from 1 to 4 per cent. The amount of rent paid by the operating companies to the corporations owning the leased lines enabled about 200 such corporations to pay small dividends to their shareholders. It will be noted that only about one-eighth of the operating railroad companies were able to pay dividends, and about one-fourth of these paid less than 4 per cent.

The total amount paid to shareholders of all railroads in the United States in 1888 is equal to 62-100 of 1 per cent. In 1887 the amount paid to shareholders was equal to 71-100 of 1 per cent. With an increase of traffic in 1888 of more than 14 per cent., we find the divisible profits reduced 12½ per cent.

The average percentage of dividends paid on railroads in New England in 1888 was 4 56-100 per cent.; in the Northwestern States, 52-100 per cent This statement of average dividends shows the difference between the results produced by Eastern and by Western State legislation relative to railroads.

The average rate per ton per mile charged for freight on the Chicago and Northwestern, the Chicago, Milwaukee and St. Paul, the Chicago, Rock Island and Pacific, the Chicago, Burlington and Quincy, the Illinois Central, and the Chicago and Alton Railroads was in 1870 2 43-100 cents; on the same roads in 1888, 85-100 of a cent

The average rate per ton per mile charged for freight on the Boston and Albany, the New York Central, the Michigan Central, the Lake Shore, the New York, Lake Erie and Western, the Pennsylvania, and the Pittsburg, Fort Wayne and Chicago Railroads in 1850 was 1 6-10 cents; the average rate charged by the same lines in 1888 was 7-10 of 1 cent.

The average rate per bushel for transporting wheat from Chicago to New York, all rail, was in 1870, 33 cents, in 1888, 14 cents. The editor of *Poor's Manual*, commenting on these statements, says: "The thirteen roads referred to are typical of the entire railroad system. Since 1865 the reduction per ton per mile has been, on the lines named east of Chicago, 79 per cent. and since 1868, on the lines named, west of Chicago, the reduction in rates has been 73 per cent. Of the total cost of operating a railroad fully 80 per cent. is paid to labor in one way or another. Expenses of this nature cannot be materially reduced; in fact, the tendency is constantly toward an increase. The railroads named received in 1888 $20 for services for which they received $100 in 1865." He adds: "What other business can show a corresponding reduction in returns?"

Mr. Blackstone then adds with emphasis:

With seven-eighths of all the railroads in the United States to-day, the question is not how to make a profit, but how to maintain their existence, and keep out of the hands of the court.

Next Mr. Blackstone compares the "unjust treatment of railroad corporations by our Government . . . with that pursued relative to such matters in the country from which we derived the common law, where its principles are supposed to be well understood." Also:

We have before us copies of a large number of schedules of rates prepared under the act of 1888, which have been submitted to the British Board of Trade, and, as we understand, have been approved by the board. The average of such rates is more than double the rates now charged by railroads in the United States. We find in all the acts relating to railways that the English Government has recognized that the companies are entitled to charge such maximum rates as are stated in their charters, and when no such rates were stated they may charge such maximum rates as were considered reasonable at the time their railroads were constructed. We find, also, that in all cases arbitration is provided for, if a difference arises which cannot be settled by agreement between the companies and the Government.

The railroad has increased the value of lands to 50, and in many cases 100 times its original cost; but there is a limit to its ability to enhance the profits of its patrons. This fact should be recognized and admitted by the people. That limit in most cases has been reached. To arbitrarily force carriers beyond it is a species of highway robbery which cannot be justified, although it may be lawful. How stand the railroad corporations in the midst of the almost universal prosperity which they have at least done their full share to promote?

Thirty-five years ago the railway manager, the farmer, the merchant and all others met on common ground. The railway manager was permitted to consult with his patrons as to such rates as would best promote their interests, and, with proper regard for all, within reasonable limits, to act promptly upon information obtained for them, well knowing that no railway company can adopt a wiser policy than to promote the true interests of its patrons. It is for such service that payment is cheerfully made. For the last 20 years that has not been permitted. Since the poor railway has been held to service by the politician it has been going from bad to worse continually, and popular dissatisfaction has increased. To-day the railways are in a position of half-starved servants, who must be thankful for such crumbs as their masters may permit them to receive. Why this great change? What have the persons who invested their savings in railways done to merit such treatment? That the Government has the power to deprive one class of its citizens of their just rights, has been demonstrated; but, in our judgment, its exercise cannot be justified.

We do not believe that "might makes right." If it is right to arbitrarily limit the profits of one class of persons, or to deprive them of all profits, as has been done in the case of many railroads, why not do the same with other classes of persons? If "water stock" justifies such a course, what tangible property can be found in this country that does not contain the kind of "water" referred to, and why not serve all alike? We see to what absurd conclusions such suggestions lead. Why has it been possible to deprive one class in the West of their just rights that all others may profit thereby? The answer is easy. That class does not vote in the West.

It is said that we should not complain unless prepared to suggest a remedy. We will therefore suggest the ownership of railroads by the National Government, and the organization of a corps of railroad operators, who shall remain in the service during good behavior, and be in no greater degree under the influence of politicians or political parties than the army militant. The outlines of our suggestions may be stated as follows:

1. The National Government shall acquire the ownership of all the railroads in the United States which are now used for Interstate traffic; such railroads to be acquired by the exercise of its right of eminent domain, or by purchase under such limitations and rules as to price as Congress may determine.

2. Payment therefor to be made by the issue of Government bonds bearing interest at a rate not exceeding 3 per cent. per annum, said bonds to be redeemed by the annual application of a sinking fund equal in amount to 1 per cent. of the whole amount of such bonds issued; the annual interest and sinking fund to be paid from the net earnings of the railroads, and the rates of transportation from year to year to be reduced, so as to provide no more money than shall be needed for such payments.

3. To the end that citizens of each State shall be required to pay no greater rates for transportation than shall be necessary to produce an annual amount of net earnings on the railroads of the State in which they reside equal to the annual interest and sinking fund on the bonds issued by the Government in payment for such railroads, separate schedules of rates shall be made for transportation on railroads in the several States, and changed from time to time, as may be necessary to secure that object.

4. Such railroads as may be hereafter constructed and used for Interstate traffic in the several States may be purchased by the National Government or not, at its option. If the Government shall at any time not elect to purchase railroads hereafter constructed and used for Interstate traffic, it shall nevertheless have the right to make through rates from time to time for traffic over the same in con-

nection with other Interstate lines, and all such through rates shall be divided between the several lines owned by the Government and lines not so owned, in proportion to mileage.

5. A board of national railroad directors, consisting of —— persons, shall be appointed by the President of the United States, and the persons so appointed shall hold such offices during good behavior. The board of directors so appointed shall exercise general supervision over, and issue all necessary general orders relative to the maintenance and operation of such railroads, subject to such laws as Congress may from time to time enact. It shall be the duty of said board to cause proper general regulations and rules to be prepared which shall provide for the appointment and define the duties of all necessary officers and employees in the railroad service of the Government, and shall state in connection therewith the amount of compensation each officer and class of persons so employed shall receive. Such regulations shall (except in cases in which services are needed for a short time only) provide that during the first year's service each person appointed or employed shall be considered on probation, and if not discharged before the end of that year he shall not thereafter be discharged without sufficient cause, concerning which proper investigation shall be made, the intent being to keep men in the service during good behavior as far as practicable. All general regulations and orders shall be consistent with authority conferred by act of Congress.

6. All rates for Interstate traffic on all railroads in the United States to be fixed and changed from time to time by the National Board of Directors in their discretion; provided, however, that in fixing such rates the board shall see that the rates are in proper proportion with all local rates, and that the aggregate annual net earnings resulting from railroad traffic each year shall be, as nearly as practicable, equal to the amount required for the annual interest and sinking fund before referred to.

7. All schedules of rates for traffic which does not cross the boundary-line of a State or Territory of the United States may be prepared and submitted to the National Board of Directors by railroad commissioners or other persons duly authorized by State authority, and all schedules, when so prepared and submitted, shall be carefully examined by said board. If in the judgment of the board such schedules of rates are proper, and will produce the requisite amount of net earnings, they shall adopt the same. If the members of the board think otherwise, it shall be their duty to notify the commissioners or other State officers who have submitted a schedule which they are not prepared to adopt, requesting a conference, that points of difference may be agreed upon, if found proper, after consultation. If such agreement is not arrived at, then the board of directors shall make such amendments to the schedule submitted as in their judgment their duty shall require, before adopting the same. Proper provision shall be made for persons injured by accident while in the service, and for such as may, after having served —— years, become superannuated.

In view of the fact already demonstrated that the actual value of railroad investments has been reduced during the last five years nearly $1,000,000,000, and is now being reduced by the course pursued by State and Federal Governments at the rate of nearly $1,000,000 per day, it would appear that if anything is to be saved by shareholders of at least three-fourths of the railroads of the United States, there should be no further delay in making their appeal to the government or the people. The day has passed when an appeal can be successfully made to a State Legislature for indemnity on account of losses the State has caused, as was done in Illinois 35 years ago. The money which has been invested and lost in railway enterprises—no matter what has caused the loss—can not be recovered. The people have been told for many years that they have the right to demand and receive railroad transportation subject to such regulations, and for such compensation as they may dictate at their pleasure, and the courts have in substance so decided. That railroad charges are now too low to support all the railroads, has been practically demonstrated; but for reasons we need not discuss, it is probably impossible to advance them to such a degree as would be necessary to support all the roads.

Shameful as the record of the treatment of railroad shareholders by the Government has been and still is, probably nothing less potent than a special interposition of Providence can so change public sentiment as to induce the Government to do anything which could be construed as an admission that it has been in the least degree wrong or unjust in its treatment of railroad corporations during the last 20 years. The suggestion we have made appears to avoid the necessity for its making such an admission if the course we have indicated should be adopted.

The difference between the amount of annual interest and sinking fund on the Government bonds to be issued in payment for the railroads, and the amount the railroad companies now pay annually on account of interest, sinking funds, and occasional dividends would at least enable the Government to continue present rates for transportation, and would probably enable it to immediately reduce them. Rates still lower could be made from year to year as the amount of bonds outstanding is reduced by the sinking fund, and when all the bonds shall have been reduced, rates for transportation need be no greater than may be found necessary to pay operating expenses.

One of the incidental benefits to be derived from the proposed issue of Government bonds would be the use of such bonds for continuing National Banks. Under other conditions we would not advocate the purchase of the railroads by the Government; but we can see no reason to fear that the corps of railroad operators will be made a political factor, if organized as suggested, and we can see no reason why the proposed directors may not act with as much freedom from political bias, and command as much confidence as Justices of the Supreme Court, or other officers, who hold office during good behavior, now do. While, under ordinary conditions, we believe the less business the Government is charged with the better for all concerned, we, nevertheless, believe the present railroad problem contains certain elements which preclude any better solution of it.

* * * *

It is no answer to say that the object in multiplying railroads has been to regulate or to reduce them within reasonable limits. Reasonable rates cannot be secured by multiplying railroads without limit.

As well might a man at the head of a large family attempt to regulate his servants, of whom he has already a sufficient number, by adding as many as his house will hold, and then attempt to obtain good service from them by reducing their wages and keeping them in a half-starved condition.

What would be thought of such a man, who, when he finds his hungry servants agreeing to peaceably divide the limited rations within their reach, issues an order prohibiting all such agreements under severe penalties. And when he finds that, without agreement to fairly divide their daily bread, extreme hunger leads to strife, resorts to scolding, and tells them they are causing him and themselves unnecessary trouble by their failure to act like gentlemen?

We have called your attention to some of the salient features of the railroad history of our country. It is to the credit of every other country that it is without a parallel. If the history of railroad construction, and the treatment which railroad shareholders have received during the last 20 years from our Government, does not appeal to the sense of justice which is believed to be a characteristic of the American people no words of ours can do so. We do not believe that the State and Federal Governments are unable to exercise proper control over the management of railroads without reducing them to bankruptcy, as has been done in so many cases.

If our Government finds that, in order to exercise proper rule, it is necessary to ruin its most useful servants, then let us frankly admit that it is a failure, and humbly ask Queen Victoria to permit us to return to the protection of our mother country.

* * * * *

Why your railroad is now operated with more favorable results than many others in the West was explained to you in our last annual report. Briefly stated, the reason is that for many years your company has, as far as possible, continued to prepare for the existing difficulties under which all Western railroads now labor. Your company is an exception today; but we can give you no assurance that it will long so continue.

It is certainly within the power of the Government to continue its present policy. If it does continue it there will soon be no exception; all will be involved in one common destruction of railroad values.

We again request you to exert, in such manner as you may think proper, such influence as you may have with those who dictate the policy of our Government; and we still hope that, if we can induce the people to listen to us, they will say to their representatives in Congress and in the several State Legislatures, "Let justice be done."

Business at the American Well Works factory, Aurora, Ill., has opened up earlier than usual, with fair prospects for a most prosperous year's business, not only in deep well making machinery, but in heavy pumping outfits, both for deep artesian work and corporate water plants. Correspondence solicited from those interested.

Seamless Metal Bottles.

A very remarkable piece of die work is illustrated in Figs. 1 and 2 which show a general and broken view of a steel bottle recently made by the Avery Stamping Company, Cleveland, Ohio. These bottles, which are about 15 inches in diameter by 16 inches high and with neck about 5 inches in diameter, inside measurement, are made from flat sheet steel $\frac{9}{16}$ inch thick pressed and formed into shape by means of dies. These bottles were wanted by a manufacturing concern who we are told had previously been all over the

Steel Bottles.—Fig. 1.—General View of Bottle.

United States and Europe to get the work done, but without success. The Avery Stamping Company, however, contracted to manufacture these goods and are now making them regularly, showing that the work is practicable. This company make a specialty of pressing sheet metals into peculiar and intricate shapes for commercial uses heretofore thought impossible. They are able to take flat sheet metals of any kind, of the requisite strength and thickness and form them into intricate shapes and keep a uniform thickness throughout the article made, and claim to not change the original thickness of the flat sheet metal, which they started with, that is they will take a 16-gauge sheet of steel, and draw and press it into the desired shape, and when it is finished it is 16 gauge throughout. Pressing and stamping of sheet metals is old, but heretofore it has mainly been done in very light sheets, like tin plate, sheet iron,

Fig. 2.—Broken View of Bottle.

thin copper and brass, but this company makes a specialty of heavy work from a $\frac{1}{16}$ inch up to $\frac{1}{4}$-inch thick. They claim that they can draw a cylinder 5 feet long and keep the original thickness in the head and sides of the cylinder. By their methods of working, they treat the metal they will use very kindly, and are thus enabled to produce these remarkable results. The Avery Stamping Company have a very complete plant for this class of work and as they make all their own dies and tools, and have built for their use presses of their own design they are prepared to manufacture in large quantities all special articles of this character. They have an exceptionally large hydraulic plant and can work sheet steel $\frac{1}{4}$ inch thick.

The Cold Wave Refrigerator.

In the accompanying illustrations we represent the article above named, which is manufactured by the F. F. Adams Company, Erie, Pa. In Fig. 1 a perspective view of the refrigerator is presented, while

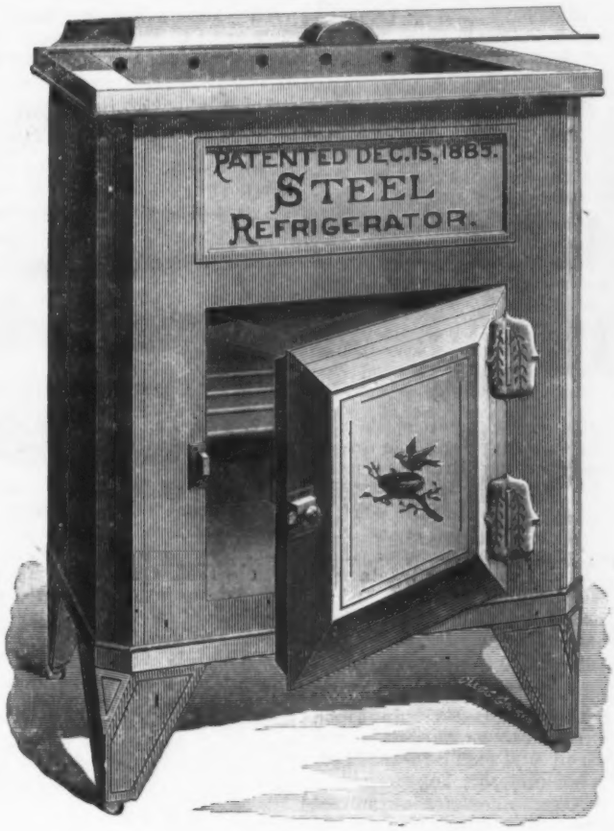


Fig. 1.—The Cold-Wave Refrigerator.

the parts of which it consists are shown in Fig. 2. The refrigerator is constructed of sheet steel, galvanized, and is made in sections so that each side, top and bottom forms a complete air-tight compartment. The vacuum or air-space is referred to as the best non conductor of heat. The sections forming the sides, back, &c., are so accurately adjusted and fitted to each other that it is said the refrigerator can be taken apart or put together in two minutes, thus permitting the entire interior to be thoroughly cleansed, aired and dried whenever there is any indication of impurity. The construction of the interior is explained to be such that the current of air in the ice-box descends through the lower aperture to the bottom of the refrigerator, replacing the warmer air, which has been forced to ascend, carrying the impurities of the provision chamber with it into the flues which lead into the upper part of the ice-box, where they are condensed and pass off with the waste water. The air becoming cold from contact with the ice again falls, thus keeping a constant circulation of pure, cold, dry air. The refrigerator is handsomely painted and striped in rich, dark colors and finished with a heavy coat of coach varnish and is made of three sizes. Among the advantages claimed for it are these: That the air-chamber forms a perfect non-conductor of heat; that it can be easily taken apart and thoroughly cleaned, aired and dried; that it is lighter than the ordinary "filled" refrigerators, and therefore more easily handled; that it is proof against rust, dust, mice and rats, and that it possesses exceptional durability and is put on the market at a very low price.

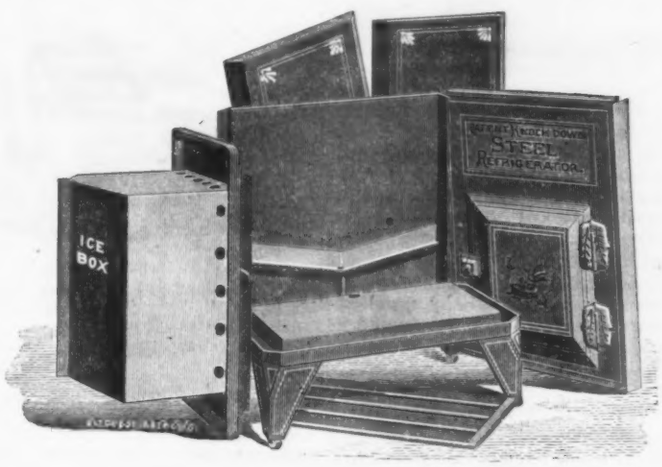


Fig. 2.—Parts of the Cold-Wave Refrigerator.

Sohn's Adjustable Foot-Rest.

We illustrate in the accompanying cut Sohn's Patent Adjustable Foot-Rest for radiators. This device is the invention of J. A. Sohn, Wichita, Kan., and is being manufactured and placed upon the market by the Chicago Nickel Works, 95 Ohio street, Chicago, Ill. In speaking of this article the makers refer to the popularity of stove foot-rests, which have come into such general use during recent years. The radiator rest which they manufacture is adapted to all forms of radiators and is readily attached and adjusted to any desired hight by means of a simple clamp and thumb-screw. It is particularly mentioned that the rest is not supported from the floor and therefore does not injure the carpets or form a place for the accumulation of dust. The rest is made in any size desired and is adapted for all the different styles of radiators. It is finished in nickel-plate and forms a neat and serviceable attachment to the radiator. We understand that though this device has been on the market but a short time it already commands a large sale, and that the manufacturers are pushed to their utmost to fill orders.

Sohn's Adjustable Foot Rest.

Diamond Self-Locking Scandinavian Padlock.

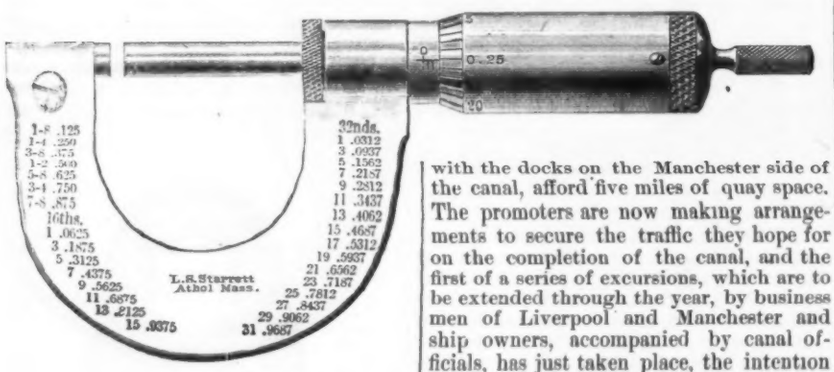
Slaymaker, Barry, & Co., Lancaster, Pa., are manufacturing this padlock, a broken view of which is presented herewith showing the interior mechanism. This padlock has the Scandinavian style of case and shackle, thus giving requisite strength. One of the novel features of the lock shown is that it possesses upright tumblers which are journaled in the case and which will not get out of order with ordinary use. Reference is made to the fact that there are no revolving tumblers

Diamond Self-Locking Scandinavian Padlock.

which are liable to jar out of line and prevent the key from entering. The working of the tumblers, it is also stated, is not affected by rust. One tumbler is started before the other when the key is inserted, and both of them are in the center when the shackle is released and are never in the same position relatively to each other in any two locks in a box, and the movable change or bar is always between them. This construction is referred to by the manufacturers as making the lock almost unpickable. The device is self-locking in that the withdrawal of the key secures the shackle, a half turn to the right and back again unlocking and locking the padlock. The locks are made in malleable iron, steel and brass and have nickel-plated flat steel keys. The springs are oil-tempered and tested and cannot get out of place. The shackles are nickel-plated, and the keyhole is covered by a revolving brass washer. Two keys are furnished with each size of lock, and all sizes of iron and brass locks can be had with chains. We are advised that they are sold at a price which enables them to compete with any of the standard Scandinavian padlocks.

Starrett's "Speeded Screw" Micrometer.

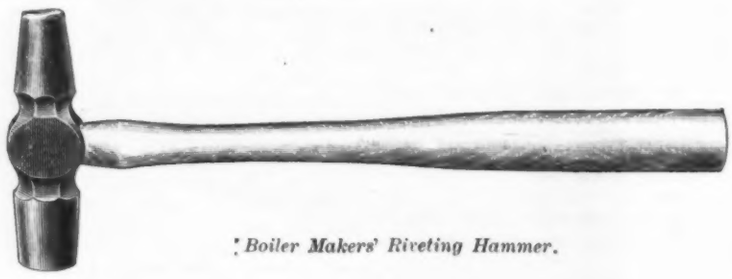
L. S. Starrett, Athol, Mass., is manufacturing the micrometer shown herewith. The cut, which is full size, represents the contrivance with a small knurled thumb piece on the operating end of the spindle, by means of which its rotation is speeded about three to one. An improved, close-fitting, wear-compensating nut is formed by a threaded bushing screwed into the barrel of the micrometer frame, a shoulder on this bushing coming solid against the end of barrel. The inner end of the bushing is split, and a small section formed in each side, sprung slightly forward and in a minute degree shortens in relation to the threads in the rigid part of the nut. It is stated that as the threaded end of the spring sections bear on the screw they not only create a continuous uniform friction, but hug the screw back, automatically taking up all back lash and wear. This arrangement removes the necessity of slotting the barrel, and hence the screw and nut are completely protected from dirt. A take-up or locking device to hold the spindle central, rigid or firm is provided by means of a knurled thimble nut screwed into the opposite end of the barrel and telescoping the tapering end of a split bushing inside. A slight turn of the nut contracts the bushing around the spindle to a close fit or locks it firmly, thus making, it is claimed, a solid gauge when desired of great reliability. Every micrometer is warranted accurate. The anvil end of micrometer frame and spindle are of the same size, which permits calipering small projections, ledges, flanges, etc.



Starrett's Speeded Screw Micrometer.

Boiler Makers' Riveting Hammer.

The cut herewith given represents a new Riveting Hammer for boiler and bridge makers. It is made of best tool steel from designs which are the result of a year's patient investigation and consultation with the leading boiler makers of the country. It weighs three pounds and is handled with second growth hickory. The use of the heavy pin in breaking down the rivet saves much time, and the manufacturer claims that a gang of riveters will drive 20 per cent. more rivets than with the style usually carried in stock. Of course many of the shops now make their own hammers and some of them something similar to this, but the point is made that they can buy the stock hammers cheaper than they can make them themselves and also have the advantage of a "warranted article." Fred. A. Rich, 23 South Canal street, Chicago, manufacturer of boiler makers' specialties, is putting these hammers on the market.



Boiler Makers' Riveting Hammer.

Work on the Manchester ship canal, which is contracted to be finished at the end of next year, is in such a forward condition that the contractors hope to have it completed before the expiration of the contract time. Two hundred miles of temporary track are laid and 166 locomotives are employed. For some time to come work will be prosecuted day and night, a large stock of Lucigen lights having been purchased to light the workings. The docks at Salford, which are large enough to accommodate the largest Atlantic liner, are nearly completed. They, with the docks on the Manchester side of the canal, afford five miles of quay space. The promoters are now making arrangements to secure the traffic they hope for on the completion of the canal, and the first of a series of excursions, which are to be extended through the year, by business men of Liverpool and Manchester and ship owners, accompanied by canal officials, has just taken place, the intention being to induce them to secure locations for freighting and manufacturing enterprises.

A careful examination of the statistics of the grain trade coming to New York during the year 1889 shows that, in comparison with the traffic to other ports, there has been no serious falling off. The Erie Canal has retained its share to a remarkable extent, considering the strong competition with which it had to contend. It lost heavily in wheat, but gained in corn. The heavy corn exports via Baltimore were the natural result of extraordinary crops, and indicate no permanent diversion to the Southern route. The canal as a factor in New York trade possesses an importance not easily exaggerated, and all improvements designed to enlarge its capacity and cheapen the cost of transportation are consistent with a judicious regard for the interests of the general taxpayer, as well as for those of the mercantile classes.

Walker's Improved Lemon Squeezer.

The accompanying illustration represents a new lemon squeezer put on the market by the Erie Specialty Mfg. Company, Erie, Pa. It will be observed that it is attached to the shelf or counter by means of a clamp and has an attachment in which the glass is held for the reception of the juice. The manner in which the juice is extracted by means of the squeezer is indicated in the cut, from which it will be observed that the plunger which is forced down into the lemon can be rotated by means of the handle from side to side in order to secure thorough extraction of the juice. It is also provided with a strainer by which the seeds and pulp are prevented from getting into the glass, and it has a guard to prevent the juice from squeezing out on the operator's clothes. The rapidity of its operation and the fact that parts coming in contact with the lemon are easily removed, are points made in regard to it. The body and lever are nickel-plated. It is intended to retail at $3.50.

Walker's Improved Lemon Squeezer.

Much is said in the United States of the insufferable burden thrown on the German people in supporting a large army, but Joseph Wharton, in a lecture before the Philadelphia Manufacturers' Club, said: "The cost is about $14,000,000 less per annum than that of our small army and our bloated pension list."

Patent on Process and Product.

There are several methods followed in securing protection on inventions. Sometimes a patent is drawn up so as to cover the product, and again the process alone is patented, while it is not an unusual practice to so distribute the ideas through several specifications as to confuse any one who would attempt to infringe or make use of them in any way. The subject of process and product patents, which is of interest to all inventors, has recently been brought into special notice by a decision of the Commissioner of Patents, and with a view to giving our readers reliable information on the several forms of protection, we have obtained from a reliable authority in patent law the following result of an examination made to determine first, whether a process can be patented independent of the products, or the apparatus which is required to practice it; secondly, whether the process and product can be claimed in the same patent; thirdly, whether either can be patented after a patent for the other has been issued.

The various Commissioners of the Patent Office have altered the rules from time to time, and have made decisions which somewhat conflict upon these points, so that a single patent has sometimes been issued for a product and the process of producing it, and at other times such a patent has been refused upon the ground that they were separate inventions. Thus, on May 16, 1882, patent No. 255,057 was issued with a claim to a substitute for leather, and a separate claim for the method of making the same. A patent having the same peculiarity was issued June 17, 1884, No. 300,730, for a combined iron and steel plate and the process of manufacture. Prior to this date, on June 13, 1873, Commissioner Leggett, in the case of Murrey *vs.* Wuterich, enunciated the principles underlying this matter. He showed first, that the United States statutes intended a patent to cover only a single invention; secondly, that the matter which might be embraced in a single patent is unquestionably a subject for the discretion of the Commissioner; thirdly, that defects in the issue of a patent may be cured, in court, by force of the presumption that public officers have done their duty, and by the rule that a patent once granted is to be construed liberally in favor of its validity.

This general rule and the "exception" to it were stated in the Supreme Court of the United States, in Hogg *vs.* Emerson. The court said "the public officers have generally declined to issue Letters Paten for more than one patent (invention) described in them" "and if Letters Patent otherwise issue inadvertently, to hold them as a general rule, *null*." But it is a well-established exception that patents (inventions) "may be united, if two or more (included in one set of Letters) are related to a like subject, or are in their nature or operation connected together." Under this "exception" the court sustained the patent before them, the inventions "being all connected with the use of the improvements in the steam engine, as applied to propel carriages or vessels." In Goodyear *vs.* Providence Rubber Company, Judge Clifford said "no doubt can be entertained that a new product or manufacture and a new process or method of producing the new article are the proper subjects of separate and distinct claims in an original patent." This dictum was uttered upon the consideration of an original patent reissued in two divisions, which covered respectively the process and the product. Commissioner Leggett also decided, in the appeal of R. M. Franklin, on July 24, 1873, that "every claim in an application must in one sense cover an independent invention, yet all the claims must pertain to one common subject."

On August 3d, 1877, Commissioner Spear, upon an appeal taken by Daily, for "improvement in the manufacture of ornamented felt fabrics," reviewed the decision in the case of "Murrey *vs.* Wuterich" and distinguished between cases where the product could be made by various processes, and cases in which the process and product were inseparable. He said "no rule of universal application can be given for this class of cases more than for any other; but in each case, as it comes up for consideration, the inquiry must be made whether the process or machine and the product thereof, are so separate and distinct that they can be called independent inventions," and he decided "I am of the opinion that the ends of justice are better subserved by allowing in one patent the claims for machines and processes and products wherever their relation is such to each other as not to make it plain that they are independent inventions."

The above decisions show that a patent may properly contain distinct claims to a process and to the article produced by such process; if the article and process are inseparable, as in cases where the process cannot be practiced without producing the article or the article cannot be made by any other process. But in cases where the article may be made by a variety of processes it could not properly be secured in the same patent with a particular process for its manufacture. The decisions of the Supreme Court are, of course, the ultimatum in deciding these points, and the decision of January 24, 1881, in the case of Tilghman *vs.* Proctor, fully settled that a process is patentable in itself, irrespective of the particular mode or form of apparatus for carrying it into effect. Tilghman's patent for a process was sustained, and this decision is constantly cited in support of process patents. Tilghman's claim was for the "manufacture of fat acids and glycerine from fatty bodies by the action of water at a high temperature and pressure," and the decision shows that a process may be patented irrespective of the product that may be produced thereby.

While it is thus established that an article may be patented, or a process for making such article may be separately secured, a conflict of decisions has existed in the courts which make it doubtful whether a patent for the process of making an article could be lawfully secured after a patent for the article had been issued. These decisions relate to an apparatus and a process performed by such apparatus, and the first decision sustained the inventor in taking out a patent for his process after a machine patent describing the same had been made public. The later decision by the Supreme Court of the United States declares that the inventor cannot secure a valid patent for any process shown in a previous patent.

In the Circuit Court decision, in the suit of the Eastern Paper Bag Company, *et al*, *vs.* Standard Bag Company, *et al*, the judge held that the inventor did not abandon his right to patent the process by describing it in a prior patent. He took the ground that a machine and a process for using it being different things, a patent upon one could not operate as an abandonment of any claim upon the other, provided "the application for the second patent is made before the statutory forfeiture of two years' prior use has run." The Supreme Court, however, in the Mosler Safe and Lock Company *vs.* Mosler, Bahmann & Co., decided May 14, 1888, that "after a patent is granted for an article described as made by causing it to pass through a certain method of operation to produce it, as in this case, by cutting away the metal in a certain manner and then bending what is left in certain manner, the inventor cannot afterward on an independent application, secure a patent for the method or process of cutting away the metal and then bending it so as to produce the identical article covered by the previous patent, which article was described in that patent as produced by the method or process sought to be covered by taking out the second patent."

While separate valid patents may therefore be secured for a process and its product, it would appear that a patent for the process and a patent for its product should be taken out at the same time to render them valid.

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CURRENT HARDWARE PRICES.

FEBRUARY 26, 1890.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

Adjusters, Blind.

Domestic.....₩ doz $3.00, 33⅓%
Excelsior.....₩ doz $10.00.....50&10&2%
Washburn's Self-Locking.....20@20&10%

Ammunition.—

Caps, Percussion, ⅝ 1000—
Hicks & Goldmark's and Union Metallic Cartridge Co.
F. L. Waterproof, 1-10's.....34@35¢
E. B. Trimmed Edge, 1-10's.....46@48¢
E. B. Grnd. Edge, Cent. Fire, 1-10's.....46@47¢
Musket Waterproof, 1-10's.....50¢
G. D.....28¢
S. B. Genuine Imported.....45¢
Eley's E. B.....54¢ @ 55¢
Eley's D Waterproof, Central Fire...$1.60

Cartridges—
Rim Fire Cartridges.....50&5&2 %
Rim Fire Military.....15&2 %
Cent. Fire, Pistol and Rifle.....25&5&2 %
Cent. Fire, Military and Sporting.....15&5&2 %
Blank Cartridges, except 22 and 32 cal., additional 10 % on above discounts.
Blank Cartridges, 22 cal., $1.75.....2 %
Blank Cartridges, 32 cal., $3.50.....2 %
Primed Shells and Bullets.....15&5&2 %
B. B. Caps, Round Ball, $1.75.....2 %
B. B. Caps, Con. Ball, Swgd., $2.00.....2%

Primers—
Berdan Primers, $1.00.....2%
B. L. Caps (for Sturtevant Shells) $1.00.....2%
All other Primers, $1.20.....2%

Shells—
First quality, 4, 8, 10 and 12 gauge.....25&10&2%
First quality, 14, 16 and 20 gauge ($10 list).....30&10&2%
Star, Club, Rival and Climax brands.....20&10&2%
Selbold's Comb. Shot Shells.....15&2%
Brass Shot Shells, 1st quality.....60&2%
Brass Shot Shells, Club, Rival, Climax.....65&2%
I X L, 10 and 12 guage.....40&5&2%
"Special," 16 gauge.....30&10&5&2%
"Special," 10 and 12 gauge.....40&10&2%
Fowler's Pat.....$3.25

Shells Loaded—
Standard. List.....40@40&5%

Wads—Price per M.

U.M.C.&W. R. A.—B. E., 11 up..	68¢	Dis.30&2
U.M.C.&W. R. A.—B. E., 9&10...	82¢	
U.M.C.&W. R. A.—B. E., 8.....	96¢	
U.M.C.&W.R. A.—B. E., 7.....	$1.10	
U.M.C.&W. R. A.—P. E., 11 up..	1.15	
U.M.C.&W. R. A.—P. E., 9&10..	1.50	
U.M.C.&W. R. A.—P. E., 8.....	1.70	
U.M.C.&W.R. A.—P. E., 7.....	1.80	

Eley's B. E., 11 up.....$1.75
Eley's P. E., 11@20.....2.80

Anvils.—

Eagle Anvils, ₩ ℔ 10¢.....15@15&5%
Peter Wright's.....10½¢
Armitage's Mouse Hole.....9¢
Armitage's Mouse Hole, Extra.11½@11¾¢
Trenton.....9½@10¢
Wilkinson's.....9¾@10¢
J. & Riley Carr, Pat. Solid.....11@11½¢
Moore & Barnes Mfg. Co.....33⅓%

Anvil Vise and Drill—
Millers Falls Co., $18.00.....20%
Cheney Anvil and Vise.....25%
Allen Anvil and Vise, $5.00.....40&10%
Star.....45&5 %

Apple Parers—See Parers, Apple, &c.

Augers and Bits—

Douglass Mfg. Co.
Wm. A. Ives & Co.
Humphreysville Mfg. Co.
French, Swift & Co. (F. H. Beecher, P. S. & W. Co.
Rockford Bit Company
} 70%

Cook's, Douglass Mfg. Co.....55 %
Cook's, N. H. Copper Co.50&10@50&10&5%
Ives' Circular Lip.....60%
Patent Solid Head.....30%
C. E. Jenning & Co., No. 10, extension lip.....40%
C. E. Jennings & Co., No. 30.....60%
C. E. Jennings & Co., Auger Bits, ₩ set, 32½ quarters, No. 5, $5; No. 30, $3.50.20%
Lewis' Patent Single Twist.....45%
Russell Jennings' Augers and Bits.25&10%
Imitation Jennings' Bits.....60@60&5%
Snell's Jennings Pattern.....60%
Pugh's Black.....20%
Rockford, Jenning's Pattern.....60%
Car Bits.....50&10@60%
Car Bits, P. S. & W. Co.....60&10 %
Snell's Car Bits.....60%
L Hommodieu Car Bits.....15&10%
Worstner Pat. Auger Bits.....10%
Cincinnati Bell-Hangers' Bits.....30%

Bit Stock Drills—
Morse Twist Drills.....50&10&5%
Standard.....50&10&5%
Cleveland.....50&10&5%
Syracuse, for metal.....50&10%
Syracuse, for wood (wood list).30@30&5%
Williams' or Holt's, for metal.50&10&10%
Williams' or Holt's, for wood...40&10%
Cincinnati, for wood.....30&5%
Cincinnati, for metal.....40&10%

Expansive Bits—
Clarks' small, $18; large, $26...35@35&5%
Ives' No. 4, ₩ doz $60.....40%
Swan's.....40%
Steer's, No. 1, $26; No. 2, $22.....35%
Stearns' No. 2, $48.....20%

Gimlet Bits—
Common.....₩ gross $2.75@$3.25
Diamond.....₩ doz $1.10.....25&10%
Bee.....25@25&5%
Double Cut, Shepardson's.....45@45&10%
Double Cut, Ct. Valley Mfg. Co...30&10%
Double Cut, Hartwell's, ₩ gro.....$5.25
Double Cut, Douglass'.....40&10%
Double Cut, Ives'.....60@60&10%

Hollow Augers—
Ives.....
French, Swift & Co.....
Douglass'.....
} 33⅓@ 33⅓&10%

Bonney's Adjustable, ₩ doz $48...40&10%
Stearns'.....20&10%
Ives' Expansive, each $4.50.....50&5%
Universal Expansive, each $4.50.....20%
Wood's.....25@25&10%
Cincinnati Adjustable.....30@30&5%
Cincinnati Standard.....25&10%

Ship Augers and Bits—
L'Hommedieu's.....15&10@15&10&5%
Watrous'.....15&10@15&10&10%
Snell's.....15&10@15&10&5%
Snell's Ship Auger Patt'n Car Bits, 15&10@15&10@5%

Awl Hafts—See Hafts, Awl.

Awls, Brad Sets, &c—

Awls, Sewing, Common ₩ gr $1.70, 35%
Awls, Should. Peg. ₩ gr $2.45, 40@40&10%
Awls, Pat. Peg...₩ gr 63¢.....40@40&10%
Awls, Shouldered Brad..2.70 ₩ gr.....35%
Awls, Handled Brad...$7.50 ₩ gr.....45%
Awls, Handled Scratch ₩ gr, $7.50.35&10%
Awls, Socket Scratch. ₩ doz, $1.50.25@30%

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Makers' and Special Brands—
First quality.....₩ doz $6.00@$6.50
Others.....₩ doz $5.50@$5.75

Axle Grease—See Grease, Axle.

Axles—

No. 1, 4¼@5¢, No. 2 5½¢@6¾¢
Nos. 7 to 14.....55&5%
Nos. 15 to 18.....47½%
Nos. 19 to 22.....70%
} 3 % cash

National Tubular Self-Oiling: Standard Farm (1 to 5) and Special Farm (A1 to A5):
Less than 10 sets.....33⅓%
Over 10 sets.....33⅓&5%

Bag Holders.—See Holders, Bag.

Balances—

Spring Balances.....50%
Common 24-℔.....₩ doz $1.50.....50%
Chatillon's Spring Balances.....50%
Chatillon's Circular Spring Balances.60%

Bars.

Crow—
Cast Steel.....₩ ℔ 4¼¢
Iron, Steel Points.....₩ ℔ 3¾¢

Basins, Wash—

Standard Fiberware, No. 1, 10½-inch, $2; 12-inch, $2.25; 13½-inch, $2.75; 15-inch, $3.25.

Beams, Scale—

Scale Beams, List Jan. 12, '82...50&10@50&10&5%
Chatillon's No. 1.....40%
Chatillon's No. 2.....50%

Beaters, Egg, &c—

Keystone, P.D.&C., Each, No. 1, $1; No. 2, $2.....25 %
Dover.....₩ doz $1.50
National, ₩ doz $4.50.....33⅓%
Family (T. & S. Mfg. Co.), ₩ gro $17.00@$18.00
Duplex (Standard Co.).....₩ doz $1.25
Rival (Standard Co.).....₩ doz $1.00
Duplex Extra Heavy (Standard Co.)...₩ doz $3.50
Triumph (T. & S. Mfg. Co.), ₩ gro $10.50@$11.50
Advance, No. 1.....₩ gro $10.50
Advance, No. 2.....₩ gro $10.00
Bryant's.....₩ gro $14.00
Ayres' Spiral.....₩ gro $5.00
Double (H. & R. Mfg. Co).....₩ gro $16.20
Easy (H. & R. Mfg. Co.).....₩ gro $14.00
Triple (H. & R. Mfg. Co.).....₩ gro $16.20
Spiral (H. & R. Mfg. Co.).....₩ gro $4.50
Paine, Diehl & Co.'s.....₩ gro $24.00

Bells—

Cow—
Common Wrought.....60&10%
Western.....20&10%
Western, Sargent's list.....70&10%
Kentucky, "Star".....20&10%
Kentucky, Sargent's list.....70&10%
Dodge, Genuine Kentucky....70&70&10%
Texas Star.....50&10@50&10&5%
Call.....40@40&5%
Farm Bells.....₩ ℔ 3¢@3½¢
Steel Alloy Church and School Bells..40%

Door—
Gong, Abbe's.....33⅓&10%
Gong, Yankee.....45&10%
Gong, Barton's.....40&10@50%
Crank, Taylor's.....25&10%
Crank Brooks'.....50&10&2%
Crank Cone's.....10%
Crank, Connel's.....20&10%
Lever, Sargent's.....60&10%
Lever, Taylor's Bronzed or Plated....net
Lever, Taylor's Japanned.....25&10%
Lever, R. E. M. Co.'s.....50&10&2%
Pull, Brook's.....50&10&2%
Pull, Western.....25&10%

Electric,
Wollensak's.....20%
Bigelow & Dowse.....20%
Taylor's.....20%

Hand—
Light Brass.....70&10 @ 75%
Extra Heavy.....60&10%
White Metal.....60&10&10%
Silver Chime.....33⅓&10%
Globe (Cone's Patent).....25&10@35%

Bellows—

Blacksmiths'.....60@60&5%
Molders'.....40@40&10%
Hand Bellows.....40&10@50%

Belting, Rubber—

Common Standard.....70&10%
Standard.....70&70&5%
Extra.....60&5@60&10%
N. Y. B. & P. Co., Carbon.....60&10&5%
N. Y. B. & P. Co., Diamond.....50&10%

Bench Stops—See Stops, Bench.

Benders, Upsetters, Tire.

Stoddard's Lightning Tire Upsetters..15%
Detroit Perfected Tire Bender.....15%

Bits—

Auger, Gimlet, Bit Stock, Drills, &c., see Augers and Bits.

Bit Holders—See Holders.

Blind Adjusters—See Adjusters, Blind.

Blind Fasteners—See Fasteners, Blind.

Blind Staples—See Staples, Blind.

Blocks—

Ordinary Tackle, list May 20, 1889...50%
Cleveland Block Co., Mal. Iron.....50%
Moore's Novelty, Mal. Iron.....50%

Bolts—

Carriage, Machine, &c.—
Com. list June 10, '84.....70&12½&2%
Genuine Eagle, list Oct., '84...75&10@80%
Phila. pattern, list Oct. 7, '84..80@80&10%
R.B.&W., old list.....70%
Machine, list Jan. 1, 1890.....75&10
Bolt Ends, list Jan. 1, 1890.....75&10

Door and Shutter—
Cast Iron Barrel, Square, &c..70@70&10%
Cast Iron Shutter Bolts.....70@70&10%
Cast Iron Chain (Sargent's list)....65&10%
Ives' Patent Door Bolts.....60%
Wrought Barrel.....70@70&10%
Wrought Square.....70@70&10%
Wr't Shutter, all Iron, Stanley's..60&10%
Wr't Shutter, Brass Knob, " ..40&10%
Wr't Shutter, Sargent's list.....60&10%
Wr't Sunk Flush, Sargent's list....55&10%
Wr't Sunk Flush, Stanley's list....50&10%
Wr't B.K.Flush, Com'n " ....55&10%

Stove and Plow—
Stove.....60%
Plow.....60&5%
R. B. & W., Plow.....55%

Tire—
Common, list Feb. 28, '83.....65%
Port Chester Bolt and Nut Company:
Empire, list Feb 28, '83.....65%
Keystone, Philadel., list Oct. '84....80%
Norway, Phila., list Oct. '84.....75%
American Screw Company:
Norway, Phil., list Oct. 16, '84.....75%
Eagle, Phil., list Oct. 16, '84.....80%
Philadel., list Oct. 16, '84.....80%
Bay State, list Feb. 28, '83.....65%
R.B.&W., Philadel., list Oct. 16, '84....80%

Borers, Tap.

Common and Rind.....20&10%
Ive's Tap Borers.....33⅓&5%
Enterprise Mfg. Co.....20&10&30%
Clark's.....33⅓@35%

Borax.....₩ ℔ 9½@10¼¢

Boring Machines—See Machines, Boring.

Bow Pins—See Pins, Bow.

Boxes, Wagon.

Per ℔.....24¢

Braces.—

Amidon's
Barker's Imp'd Plain.....75&10@80%
Barker's Imp. Nickeled....65&10&70%
Ratchet.....75&10@80%
Eclipse Rachet.....60%
Globe Jawed.....40@40&10%
Corner Brace.....40@40&10%
Universal, 8 in., $2.10 10 in.....$2.25
Buffalo Ball.....$1.10@$1.15
P. S. & W. Co., Peck's Patent.....60%
Barber's,
Nos. 10 to 16.....50%
Nos. 30 to 33.....50%
Nos. 40 to 63.....50&10%
Barker's,
Nos. 8, 10 and 12.....75&10@80%
Plated, Nos. 8, 10 and 12....65&10@70%
Bartholomew's,
Nos. 25, 27 and 30.....50&10@60&5%
Nos. 117, 118, 119.....70@70&5%
Common Ball, American.....$1.00@$1.10
Ives' New Haven Novelty.....70@70&5%
New Haven Ratchet.....60&5@60&10%
Barber Ratchet.....60&5@60&10%
Barbers.....60&5%
Spofford.....60&5@60&10%
Osgood's Ratchet.....40&10@50%
Spofford's.....50&5@50&10%

Brackets—

Shelf plain, Sargent's list, 55&10@55&10&10%
Shelf, fancy, Sargent's list, 60&10@60&10&10%
Reading, plain.....50&10@60&10&5%
Reading, Rosette.....60&10@60&10&10%

Bright Wire Goods—See Wire.

Broilers—

Henis' Self-	Inch.....	9	10	9x11
Basting.	Per doz...$4.50	5.50	6.50	

Buckets—See Well Buckets and Pails.

Buckets, Well.

Galvanized—
Hill's.....₩ doz, 12 qt, $4.25; 14 qt, $5.25
Iron Clad.....₩ doz, 14 qt, $4.25@$4.50
Whiting's Flat Iron Band.....$4.25@4.50
Whiting's Wired Top..₩ doz $4.00@4.25

Bull Rings—See Rings, Bull.

Butcher's Cleavers—See Cleavers Butchers'.

Butts—

Brass—
Wrought Brass.....75@75&10%
Cast Brass, Tiebout's'.....33⅓%
Cast Brass, Corbin's, Fast.....33⅓&10%
Cast Brass, Loose Joint.....33⅓&10%

Cast Iron—
Fast Joint, Narrow.....50&10&5@60%
Fast Joint, Broad.....50&10@60%
Loose Joint.....
Loose Joint, Japanned.....
Loose Joint, Jap. with Acorns..
Parliament Butts.....
Mayer's Hinges.....
Loose Pin, Acorns.....
Loose Pin, Acorns, Japanned...
Loose Pin, Acorns, Japanned, Plated Tips.....
} .70&5@ 70&10%

Wrought Steel—
Fast Joint, Narrow.....
Fast Joint, Lt. Narrow.....
Fast Joint, Broad.....
Loose Joint, Broad.....
Table Butts, Back Flaps, &c.....
Inside Blind, Regular.....
Inside Blind, Light.....
Loose Pin.....
} .70&5@ 70&10%

Bronzed Wrought Butts.....50%

Calipers—See Compasses.

Calks, Toe—

Gautier.....₩ ℔ 5½@6¢
Dewicks (Burke).....₩ ℔ 5½@6¢

Can Openers—See Openers, Can.

Cards—

Horse & Curry.....10&10@10&10&10%
Cotton.....10@10&10%
Wool.....10@10&10%

Carpet Stretchers—See Stretchers Carpet.

Carpet Sweepers—See Sweepers Carpet.

Cartridges—See Ammunition.

Casters—

Bed.....
Plate.....
Shallow Socket.....
} Brass....55@55&10% Others...60@60&10%

Deep Socket.....40&10%
Yale Casters, list May, 1884...30&10@40%
Yale, Gem.....60@60&5%
Martin's Patent (Phoenix).....45&10@50%
Payson's Anti-friction.....60@60&10%
Giant Truck Casters.....30%
Stationary Truck Casters.....50&10%
Socket Truck Casters.....50%

Cattle Leaders—See Leaders, Cattle.

Chain—

Trace, 6½-10-2, exact, ₩ pair, $1.03.....50&10@50&10&5%
Trace, 6½-10-3, exact, ₩ pair 92¢.....50&10@50&10&5%
Trace, 7-10-2, exact, ₩ pair $1.11.....50&10@50&10&5%
NOTE.—Traces, "Regular" sizes, 3¢ net ₩ pair less than exact.
Log, Fifth Stretcher, and other fancy Chains, List Nov. 1, 1884.....50&10@50&10&5%

American Coil, in cask lots,

3-16	¼	5-16	⅜	7-16	½	⅝	¾
$8.00	5.70	4.80	4.20	3.90	3.75	3.65	3.55

Less than cask lots, add ½¢@1¢ ₩ ℔.
German Coil, list of June 20, 1887.....50&10&5@60%
German Halter Chain, list of June 20, 1887.....50&10&5@60%
Covert Halter.....60&2%
Covert Traces.....35@2%
Oneida Halter Chain.....60@60&5%
Galvanized Pump Chain.....₩ ℔ 5@5½¢
Jack Chain, Iron.....75@75&5%
Jack Chain, Brass.....70&5@70&10%

Chalk—

White.....₩ gr 50¢
Red.....₩ gr 70¢
Blue.....₩ gr 85¢
See also Crayons.

Chalk Lines—See Lines.

Chisels—

Socket Framing and Firmer.
P. S. & W.....
New Haven.....
Witherby.....
Mix.....
} ..75 @ 75&10

Ohio Tool Co.....
Douglass.....75@75&5%
Buck Bros.....30%
Merrill.....60&10@60&10&5%
L. & I. J. White.....30@30&5%

Tanged and Miscellaneous.
Tanged Firmers.....40&10@50%
Butchers'.....$4.75@$5.00
Spear & Jackson's.....$5 to £
Buck Bros.....30%
Cold Chisels, ₩ ℔.....16@19%

Chucks—

Beach Pat.....each, $8.00.....20%
Morse's Adjustable,each, $7.00, 20@20&5%
Danbury.....each, $6.00, 30@30&5%
Syracuse, Bals Pat.....25%
Skinner's Pat. Drill Chucks.....30%
Skinner's Independent Lathe Chucks.40%
Skinner's Pat. Comb. Chuck.....40%
Union Mfg. Co.,
Victor.....$8.50, 25%
Combination.....40%
Universal.....40%
Independent.....40%

Clamps—

R. I. Tool Co.'s Wrought Iron.....25%
Adjustable, Cincinnati.....15&10%
Adjustable, Hammers.....15%
Adjustable, Stearn's.....20&10%
Stearn's Adjustable Cabinet and Corner.....20&10%
Cabinet, Sargent's.....60%&10%
Carriage Makers', Sargent's.....70&10%
Carriage Makers', P., S. & W. Co 40&10%
Eberhard Mfg. Co.....40&5@40&10%
Warner's.....40&10@40&10&5%
Saw Clamps, see Vises. Saw Filers'.
Carpenters', Cincinnati.....15%

Cleavers.

Butchers'.
Bradley's.....25@30%
L. & I. J. White.....20&5%
Beatty's.....40@40&5%
New Haven Edge Tool Co.'s.....40%
P., S. & W.....33⅓&5@33⅓&10%
Foster Bros.....30%
Schulte, Lohoff & Co.....40@40&5%

Clips—

Norway, Axle, ¼ & 5-16.....55&5&5%
2nd grade Norway Axle, ¼ & 5-16 65&5%
Superior Axle Clips.....66⅔&5&70%
Norway Spring Bar Clips, 5-16..60&5&5%
Wrought-Iron Felloe Clips.....₱ ℔, 5½¢
Steel Felloe Clips.....₱ ℔, 5¢
Baker Axle Clips.....25%

Cloth and Netting, Wire—See Wire, &c.

Cockeyes.....50%

Cocks, Brass.

Hardware list.....50&2%

Coffee Mills—See Mills, Coffee.

Collars, Dog, &c.

Medford Fancy Goods Co.....40&10%
Embossed, Gilt, Pope & Steven's list 30&10%
Leather, Pope & Steven's list.....40%
Brass, Pope & Steven's list.....40%

Combs, Curry.

Fitch's.....50&10@50&10&10%
Rubber, per doz $10.00.....20%
Perfect.....50%

Compasses, Dividers, &c.—

Compasses, Calipers, Dividers.70@70&10%
Bemis & Call Co.'s
Dividers.....60&5%
Compasses & Calipers.....50&5%
Wing and Inside or Outside.....50&5%
Double.....60%
(Call's Pat. Inside).....30%
Excelsior.....50%
J. Stevens & Co.'s.....25&10%
Starrett's
Spring Calipers and Dividers 25&10&10%
Lock Calipers and Dividers.....25&10%
Combination Dividers.....25&10%

Coopers' Tools—See Tools, Coopers'.

Cord, Sash—

Common.....₱ ℔ 10@11¢
Patent, good quality.....₱ ℔ 13@13½¢
White Cotton Braided, fair...₱ ℔ 20@20¢
Common Russia Sash.....₱ ℔ 13½¢
Patent " " ..... ₱ ℔ 15¢
Cable Laid Italian Sash.....₱ ℔ 22@23¢
Indian Cable Laid " ..... ₱ ℔ 13¢
Silver Lake—
A Quality, White, 50¢.....10&10&5%
A Quality, Drab, 55¢.....10&10&5%
B Quality, White, 50¢.....20&10&5%
B Quality, Drab, 55¢.....20&10&5%
C Quality, White (only).....26½@28¢
Sylvan Spring, Extra Braided, White, 34¢
Sylvan Spring, Extra Braided, Drab..30¢
Semper Idem, Braided, White.....30¢
Egyptian, India Hemp, Braided.....25¢
Samson—
Braided, White Cotton, 50¢...30@30&5%
Braided, Drab Cotton, 55¢....30@30&5%
Braided, Italian Hemp, 55¢...30@30&5%
Braided, Linen, 80¢.....30@30&5%

Corkscrews—See Screws, Cork.

Corn Knives and Cutters—See Knives, Corn.

Crackers, Nut—

Table (H. & B. Mfg. Co.).....40%
Blake's Pattern.....₱ doz $2.00, 10%
Turner & Seymour Mfg. Co.....50%

Cradles—

Grain.....50&5&2@50&10&2%

Crayons.

White Crayons, ₱ gr, 12¢@12½¢.....10%
D. M. Stewart Mfg. Co., Metal Workers, ₱ gr, $2.50.....25%
D. M. Stewart Mfg. Co., Rolling Mill, ₱ gr, $2.50.....25%
See also Chalk.

Crow Bars—See Bars, Crow.

Curry Combs—See Combs, Curry.

Curtain Pins—See Pins, Curtain.

Cutters—

Meat.
Dixon's ₱ doz.....40&5%
Nos..... 1 2 3 4
$14.00 $17.00 $19.00 $20.00
Woodruff's ₱ doz.....40&5%
Nos..... 100 150
$15.00 $18.00
Hales Pattern ₱ doz..... 70@70&5%
Nos..... 11 12 13
$27.00 $33.00 $45.00
American.....30%
Nos..... 1 2 3 4 5 6
Each.....$5 $7 $10 $25 $50 $60
Enterprise.....30%
Nos.....10 12 22 32 42
Each.....$3 $2.50 $4 $6 $15
Pennsylvania.....40&10%
Nos..... 1 2 3 00
₱ doz....$24.00 $28.00 $36.00 $28.00
Miles' Challenge ₱ doz .....45@45&10%
Nos..... 1 2 3
$22.00 $30.00 $40.00
Home No. 1.....₱ doz, $26.00, 55&10%
Draw Cut, each:
Nos..5 2 6 8
$50 $75 $80 $225 .....20@25%
Beef Shavers (Enterprise).....20&10@30%
Little Giant.....50%
Chadborn's Smoked Beef Cutter, ₱ doz $66.00

Tobacco.
Champion.....20&10@30%
Wood Bottom.....₱ doz $5.00@$5.25
All Iron.....₱ doz $4.25
Nashua Lock Co.'s..₱ doz, $18.00 50@55%
Wilson's.....55%
Sargents's .....₱ doz, $24, 55&10%
Acme .....₱ doz $20.00, 40%

Washer.
Smith's Pat.....₱ doz $12.00, 20&10&10%
Johnson's.....₱ doz $11.00, 33⅓%
Penny's, ₱ doz Pol. $14; Jap'd, $16.00, 55%
Appleton's.....₱ doz $16.00, 60&10%
Bonney's.....30&10%
Cincinnati.....25&10%

Cutlery—

Beaver Falls & Booth's.....33⅓
Wostenholme.....$7.75 to $

Dampers, &c—

Dampers, Buffalo.....40&10%
Buffalo Damper Clips.....40&10%
Crown Damper.....40%
Excelsior.....40&10%

Diggers, Post Hole, &c —

Samson Post Hole Digger, ₱ doz $36.00, 25&10%
Fletcher Post Hole Augers, ₱ doz $36, 20%
Eureka Diggers.....₱ doz $16.00@17.00
Leed's.....₱ doz $8.00@9.00
Vaughan's Post Hole Auger, ₱ doz $13.00@14.00
Kohler's Little Giant.....₱ doz. $18.00
Kohler's Hercules.....₱ doz. 15.00
Kohler' New Champion.....₱ doz. $9.00
Schnieder.....₱ doz. $18.00
Ryan's Post Hole Diggers..₱ doz $24.00
Cronk's Post Bars, ₱ doz $80.00, 50&5&50&10%
Gibbs Post Hole Digger, ₱ doz $30.00, 50%
Imperial, ₱ doz $15.....45%

Dividers—

See Compasses.

Dog Collars—See Collars, Dog, &c.

Door Springs—See Springs, Door.

Drawers.

Money, ₱ doz.....$18&$20

Drawing Knives—See Knives, Drawing.

Drills and Drill Stocks—

Blacksmiths'.....each $1.75
Blacksmiths' Self-Feeding, each $7.50,20%
Breast, P. S. & W.....40&10%
Breast, Wilson's.....30&5%
Breast, Millers Falls.....each $2.00, 25%
Breast, Bartholomew's....each $2 50, 25&10&40%
Ratchet, Merrill's.....20@20&5%
Ratchet, Ingersoll's.....25%
Ratchet, Parker's.....20@20&5
Ratchet, Whitney's.....20&10%
Retchet, Weston's.....20@25%
Ratchet, Moore's Triple Action..25@30%
Ratchet, Curtis & Curtis.....30%
Whitney's Hand Drill, Plain, $11.00; Adjustable, $12.00.....20&10%
Wilson's Drill Stocks.....10%
Automatic Boring Tools.....$1.75@$1.85

Twist Drills—
Morse.....50&10&5%
Standard.....50&1 &5%
Syracuse (Metal list).....50&10%
Cleveland.....50&10&5%
Williams.....50&10&10%
New Process.....50&10&5%

Drill Bits.—See Augers and Bits.

Drill Chucks.—See Chucks.

Dripping Pans-See Pans, Dripping.

Drivers, Screw.

Douglas Mfg. Co.....20@10&10%
Disston's.....4- &10%
Disston's Pat. Excelsior.....45&10%
Buck Bros.....30%
Stanley R. & L. Co.'s
Varnished Handles.....65&10%
Black Handles.....60&10%
Sargent & Co.'s
No. 1 Forged Blade.....60&10&10%
Nos. 20, 30 and 60.....60%&10& 0%
P. S. & W. 70%
Knapp & Cowles' No.1.....60&20&70%
No. 1 Extra.....60@60&10
Nos. 00 & 4.....60@60&10&5%
Stearns'.....25&10&5%
Gay & Parsons.....35%
Champion.....25&10%
Clark's Pat.....30@33⅓%
Crawford's Adjustable.....30%
Ellrich's Socket and Ratchet..25@25& 0%
Allard's Spiral, new list.....25%
Kolb's Common Sense ₱ doz $6.00,25&10%
Syracuse Screw-Driver Bits....30&30&5%
Screw-Driver Bits .....₱ doz. 50@75¢
Screw-Driver Bits, Parr's.....₱ gro $6.25
Fray's Hol. Hdle. Sets. No. 3, $14.00, 25@5&10%
P. D. & Co.'s all Steel.....50%
Cincinnati.....20&10%
Brace Screw Drivers.....25&10%
Buck Bros.' Screw-Driver Bits .... %

Egg Beaters.—See Beaters, Egg.

Egg Poachers.—See Poachers, Egg.

Electric Bell Sets.—See Bells, Electric.

Emery. — No. 4 to No. 54 to Flour,CF

	46 gr.	150 gr.	F. FF.
Kegs, ₱ ℔	4½¢	5 ¢	2½¢
½ kegs, ₱ ℔	4¾¢	5¼¢	2¾¢
¼ kegs, ₱ ℔	5 ¢	5½¢	3 ¢
10-℔ cans, 10 in case.	6 ¢	6¼¢	5 ¢
10-℔ cans, less than 10	10 ¢	10 ¢	7½¢

Enameled and Tinned Ware—See Ware, Hollow.

Escutcheon Pins—See Pins, Escutcheon.

Escutcheons.

Door Lock....Same dis as Door Locks.
Brass Thread.....60@60&10%
Wood.....25%

Fasteners, Blind—

Mackrell's, ₱ doz. $1.00.....20@20&10%
Van Sand's Screw Pat., $15 ₱ gr..60&10%
Van Sand's Old Pat., $15.00 ₱ gr..55&10%
Washburn's Old Pattern, ₱ gr.....$9.00
Merriman's.....new list
Austin & Eddy No. 2008 ₱ gr.....$9.00
Security Gravity, ₱ gr.....$9.00

Faucets.—

Fenn's.....40%
Bohren's Pat. Rubber Ball.....25%
Fenn's Cork Stops.....33⅓%
Star.....60%
Frary's Pat. Petroleum.....40&5&2%
B. & L. B. Co.
West's Lock, Open and Shut Key...50%
Star, Metal Plug, new list.....40%
Lockport, Metal Plug, reduced list..60%
Metallic Key, Leather Lined....60&10@60&10&10%
Cork Lined.....70&5@70&10%
Burnside's Red Cedar.....50%
Burnside's Red Cedar, bbl lots....50&10%
John Sommers'
Peerless Best Block Tin Key.....40%
IXL, 1st quality, Cork Lined.....50%
Diamond Lock.....40%
Perfection, Fla. Red Cedar.....50%
Goodenough Cedar.....50%
Boss Metallic Key.....50%
Reliable Cork Lined.....60%
Western Pattern Cork Lined.....50%
Self-Measuring
Enterprise, ₱ doz $50.00.....20&10%
Lane's, ₱ doz $36.00.....25&10%
Victor, ₱ doz $36.00.....25&10%

Felloe Plates—See Plates, Felloe.

Fifth Wheels.—

Derby and Cincinnati.....50&5%
Brewster.....55&5%

Files—

Domestic—
Nicholson Files, Rasps, &c.....60&10@60&10&5%
Nicholson (X. F.) Files.....25%
Nicholson's Royal Files (Seconds).....75% (extra prices on certain sizes)
Other makers, best brands.....60&20%
Fair brands.....60&10&10@70&5%
Second quality.....70&10@75&10%
Nicholson's Horse Rasps....60&10@60&10&10%
Heller's Horse Rasps.....50&7½@50&10%
McCaffrey's Horse Rasps.....50&10%
Chelsea Horse Rasps, Hand Cut...50&10%

Imported—
Moss & Gamble....List, April 1, 1883, 15%
Butcher.....Butcher's list, 20%
Stubs.....Stubs list, 25@30%
Turton's.....Turton's list, 20@25%
Greaves' Horse Rasps..American list, 60%

Fixtures.

Grindstone—
Sargent's Patent.....70&10%
Reading Hardware Co.....30&10%
P., S. & W. Co .....50&10%

Fluting Machines—See Machines, Fluting.

Fluting Scissors—See Scissors, Fluting.

Fodder Squeezers—See Squeezers, Fodder.

Forks—

Hay, Manure, &c., Asso. List.....70%
Hay, Manure, &c., Phila. List 60@60&5%
Plated, see Spoons.

Frames—

Saw—
White Vermont.....₱ gro $9.00@10.00
Red, Polished and Varnished.....₱ doz $1.50, 25%

Screen, Window and Door—
Porter's Pat. Window and Door Frame. 33⅓&10%
Warner's Screen Corner Irons..33⅓&2
Stearns' Frames and Corners..25@25&10%

Freezers, Ice Cream—

Buffalo Champion.....65&65&5%
Shepard's Lightning.....65@65&5%
White Mountain.....50&20&5%
New Arctic.....50&40&5%
American.....60%
Gem.....65%
Blizzard.....70%
Double Action Crown.....60%
Crown.....60%
Star.....60
Peerless and Giant.....60&10
Zero and Pet.....65&10
Boss.....65&10&10
Keystone, P. D. & Co., each, $1.50.....25%

Fruit and Jelly Presses—See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.

Fuse— ₱ 1000 ft
Common Hemp Fuse,for dry ground.$2.70
Common Cotton Fuse,for dry ground 2.85
Single Taped Fuse, for wet ground.. 4.25
Double Taped Fuse, for very wet gr. 5.40
Triple Taped Fuse, for very wet gr.. 6.50
Small Gutta Percha Fuse, for water. 7.50
Large Gutta Percha Fuse, for water.12.00

Gates, Molasses—

Stebbin's Pattern.....75@75&10%
Stebbin's Genuine.....60&10&10%
Stebbin's Tinned Ends.....40&10%
Chase's Hard Metal.....50&10%
Bush's.....20%
Lincoln's Pattern.....70@70&10%
Weed's.....20&10%
Boss, ₱ doz:
No. 1, $7; No. 2, $8; No. 3, $9; No. 4, $10.....60&10&10%

Gauges

Marking, Mortise, &c.....60&10%
Starrett's Surface, Center and Scratch. 25&10%
Wire, low list.....10&10%
Wire, Wheeler, Madden & Co 10%
Wire, Morse's.....50@50&5%
Wire, Brown & Sharpe's.....10@20%
Wire, P. S. & W. Co.....

Gimlets—

Nail and Spike.....50&10&5%
"Eureka" Gimlets.....40&10%
"Diamond" Gimlets.....₱ gr $5.00
Double Cut, Shepardson's.....45@45&5%
Double Cut, Ives'.....60@60&5%
Double Cut, Douglass'.....40&10%
"Bee," ₱ gr $12.....25@25&5%

Glue—

Le Page's Liquid.....25@25&5%
Upton's Liquid 35%
Le Page & Co.'s Improved Process 25@25&5%

Glue Pots—See Pots, Glue.

Grease, Axle.

Fraser's .....Keg ₱ ℔ 4¢, Pail ₱ ℔ 5¢
Fraser's, in boxes.....₱ gr $9.50
Dixon's Everlasting, in bxs...₱ doz 1℔ $1.20; 2 ℔ $2.00
Dixon's Everlasting....10-℔ pails, ea. 35¢
Lower grades, special brands, ₱ gr $5.50@$7.00

Grindstones—

Small, at factory.....₱ ton $7.50@9.00

Grindstone Fixtures—See Fixtures, Grindstone.

Hack Saws—See Saws.

Hafts, Awl.

Sewing, Brass Fer.₱ gr, $3.50.....45&10%
Pat. Sewing, Short.$1.00 ₱ doz.....40&10%
Pat. Sewing, Long.....₱ doz $1.20
Pat. Peg, Plain Top.₱ gr $10.00...45&10%
Pat. Peg, Leather Top.₱ gr $12.00.45&10%

Halters.

Covert's, Rope, ½-in. Jute..... 50&2%
Covert's, Rope, ½-in. Hemp .....50&2%
Covert's Adj. Rope Halters .....40&2%
Covert's Hemp Horse and Cattle Tie, 50&2%
Covert's Jute Horse and Cattle Ties, 60&10&2%

Hammers—

Handled Hammers—
Maydole's, list Dec. 1, '85.. ....25&10@35%
Buffalo Hammer Co.... } List Jan. 15, '87
Humason & Beckley ... } 50&50&10%
Atha Tool Co..... }
Fayette R. Plumb.....50&50&10%
C. Hammond & Son..List, Oct., 1889, 50&50&10 %
Hartford Hammer Co.....50&50&10 %
Verree.....5%
Magnetic Tack, Nos. 1, 2, 3, $1.25, 1.50 & 1.75.....30&10%
Nelson Tool Works.....40&10%
Warner & Nobles.....20@25
Peck, Stow & Wilcox 40%
Sargent's.....33⅓&10%

Heavy Hammers and Sledges—
3 ℔ and under.. .... ₱ ℔ 40¢ }
3 to 5 ℔.....₱ ℔ 36¢ } 70@70&10%
Over 5 ℔.....₱ ℔ 30¢ }
Wilkinson's Smiths.....10½¢@11¢₱ ℔

Handcuffs and Leg Irons—

R. I. Tool Co., Handcuffs, $15.00₱ doz 10%
R. I. Tool Co., Leg Irons, $25.00 ₱ doz 10%
Tower's.....25%
Daley's Improved Handcuffs: 2 Hands, Polished, ₱ doz $48.00; Nickeled, $57.00; 3 Hands, Polished, ₱ doz $72.00; Nickeled, $84.00.....25%
J. P. Lovell's Police Goods.....25%

Handles—

Cross-Cut Saw Handles—
Atkins' No. 1 Loop, ₱ pair, 28¢; No. 3 18¢; No. 6, 16¢; No. 2 and No. 4 Reversible, 18¢.
Boynton's Loop Saw Handles, 50¢....60%
Champion.....15¢

Iron, Wrought or Cast—
Door or Thumb.

Nos.....	0	1	2	3	4
Per doz....	$0.90	1.00	1.18	1.35	1.50

60&10&10%

Roggin's Latches.....₱ doz 30¢@35¢
Bronze Iron Drop Latches..₱ doz 70¢ net
Jap'd Store Door Handles—Nuts, $1.62; Plate, $1.10; no Plate, $0.88 ..... net
Barn Door, ₱ doz $1.40..... 10&10%
Chest and Lifting.....70%

Wood—

Saw and Plane.....40&10@40&10&5%
Hammer, Hatchet, Axe, Sledge, &c...40%
Brad Awl.....₱ gr $2.00
Hickory Firmer Chisel, ass'd. ₱ gr 4.50
Hickory Firmer Chisel, large. ₱ gr 5.00
Apple Firmer Chisel, ass'd.....₱ gr 5.00
Apple Firmer Chisel, large.....₱ gr 6.00
Socket Firmer Chisel, ass'd..₱ gr 3.00
Socket Framing Chisel, ass'd. ₱ gr 5.00
J. S. Smith & Co.'s Pat File.....50
File, assorted..... ₱ gr 2 75 } 40@
Auger, assorted..... ₱ gr 5.00 } 40&10
Auger, large..... ₱ gr 7.00 }
Pat. Auger, Ives'.....40&10%
Pat. Auger, Douglass..... ₱ set $1.20
Pat. Auger, Swan's .....₱ set $1.00
Hoe, Rake, Shovel, &c. .....50&10 %

Hangers—

Barn Door, old patterns...60&10&10@70%
Barn Door, New England...60&10&10@70
Samson Steel Anti-Friction.....55%
Orleans Steel.....55%
Hamilton Wrought Wood Track.....55%
U. S. Wood Track 65%
Champion.....60&10%
Rider and Wooster, Medina Mfg. Co.'s list.....70%
Climax Anti-Friction.....60%
Climax Anti-Friction for Wood Track55%
Zenith for Wood Track.....55%
Reed's Steel Arm.....50%
Challenge, Barn Door.....50%
Sterling's Imp'ved (Anti-Friction).65&10%
Victor, No. 1, $15.00; No. 2, $16.50; No. 3, $18.00..... .....50&2%
Cheritree.....50&10%
Kidder's.....50&10@60%
The Boss.....60&10%
Best Anti-Friction.....60&10%
Duplex (Wood Track).....60&10&5%
Terry's Pat., ₱ doz pr. 4 in, $10.00; 5 in. $12.00.....50&10%
Terry's Steel Anti-Friction Leader 50&10%
Terry's Steel Anti-Friction Ideal..50&10%
Cronk's Pat., No. 4, $12.00; No. 5, $14.40; No. 6, $18.00.....50&15@60%
Wood Track Iron Clad, ₱ ft. 10¢.....50 &15@60%
Carrier Steel Anti-Friction.....50@50&5%
Architect, ₱ set $6.00..... .....20%
Eclipse.....20&10%
Felix, ₱ set $4.50.....20%
Richards'.....30@30&10%
Lane's Steel Anti-Friction.....50%
Ball Bearing Door Hanger..20&10@25&10%
Warner's Pat.....20@20&10%
Stearns' Anti-Friction.....20@20&10%
Stearns' Challenge.....25&10@25&10&5%
Faultless.....40@40&5%
American, ₱ set $6.00.....20&10%
Rider & Wooster, No. 1, 62½¢; No. 2, 75¢.....40%
Paragon, Nos. 1, 2 and 3.....40&10%
Cincinnati.....25&10%
Paragon, Nos. 5, 5¼, 7 and 8.....20&10%
Crescent.....60@50&10%
Nickel Cast Iron.....50%
Nickel, Malleable Iron and Steel 40%
Scranton Anti-Friction Single Strap33⅓%
Wild West, 4 in. Wheel, $15.00; 5 in. Wheel, $21.00.....45%
Star .....40&10@40&10&5%
May .....50&5@50&10%
Barry, $6.00..... .....40&10%

Harness Snaps—See Snaps.

Hatchets—

List Jan. 1, 1886.
Isaiah Blood.....35@40%
Hunt's Shingling, Lath and Claw..40&5%
Hunt's Broad.....40%
Buffalo Hammer Co.....40&10@50%
Hurd's.....40&10@50%
Fayette R. Plumb.....40&10@50%
Wm. Mann, Jr., & Co.....50@50&5%
Underhill Edge Tool Co.....40&5@40&10%
Underhill's, Haines and Bright.... 33⅓%
C. Hammond & Son... .....40&10@50%
Simmons'..... .....40&10@50%
Peck's.....40&10@40&10&5%
Kelly's.....50@50&5%
Sargent & Co.....50%
P., S. & W. Co.....50%
Ten Eyck Edge Tool Co.40&10@40&10&5%
Collins.....10%
Schulte, Lohoff & Co.....50@50&5%

Hay and Straw Knives—See Knives.

Hinges—

Blind Hinges—

Parker.....75&2%
Palmer.....50&5&10%
Seymour .....70&2%
Nicholson.....45&10%
Huffer 50%
Clark's, Nos. 1, 3, 5, 40 and 50 75&10&5@80%
Clark's Mortise Gravity..... ...50%
Sargent's, Nos. 1, 3, 5, 11, 13 75&10@55&10&5%
Sargent's, No. 12.....77&10&10%
Reading's Gravity.....75&10@75&10&5%
Shepard's
Noiseless.....75&10%
Niagara.....80%
Buffalo.....80%
Clark's Genuine Pattern.....80%
O. S., Lull & Porter.....75&10%
Acme, Lull & Porter.....75%
Queen City Reversible. ...70&10&5@75%
Clark's Lull & Porter, Nos. 0, 1, 1½, 2, 2½, 3.....75&10&2½%
North's Automatic Blind Fixtures, No. 2, for Wood, $10.50; No. 3, for Brick, $13.50. ....25&2%

Gate Hinges—

Western..... .....₱ doz $4.40, 60%
N. E..... .....₱ doz $7.00, 55%
N. E. Reversible.....₱ doz $5.20, 55&10%
Clark's, Nos. 1, 2, 3.....60&10&5%
N. Y. State.....₱ doz $5.00, 55&10%
Automatic .....₱ doz $13.50, 50%
Common Sense.....₱ doz pair $4.50, 50%
Seymour's..... .....45&10%
Shepard's..... .....60&10&5%
Reed's Latch and Hinges. ₱ doz $12.00, 50%

Spring Hinges—

Geer's Spring and Blank Butts.....40%
Union Spring Hinge Co.'s list, March, 1886.....20%

Acme..... .....30%
J. S. .....25&10%
Empire and Crown.....20%
Hero and Monarch 55%
American, Gem, and Star.....20%
Oxford..... .....20%
Barker's Double Acting..... 20&10%
Union Mfg. Co..... .....25%
Sommer's..... .....30%
Buckman's..... .....15@20%
Chicago.....30%
Wiles'.....10%
Devore's..... .....40%
Rex.....40%
Royal..... .....60%
Reliable.....60%
Champion.....60%

Wrought Iron Hinges

Strap and T.....70&10%
Screw Hook and Strap..... { 6 to 12 in., ₱ ℔. .4 2-10¢ / 14 to 20 in., ₱ ℔.3 7-10¢ / 22 to 36 in., ₱ ℔.3 2-10¢
Heavy Welded Hook..... { 6 to 12 in., ₱ ℔.4 2-10¢ / 14 to 20 in., ₱ ℔.3 7-10¢ / 22 to 36 in., ₱ ℔.3 2-10¢
Screw Hook and Eye { ½ in., ₱ doz $1.50 / ⅝ in., ₱ doz $2.45 / ¾ in., ₱ doz $3.80 } 10%
Rolled Blind Hinges, Nos. 32 and 34 50&10%
Rolled Blind Hinges, Nos. 232 and 234 55&10%
Rolled Plate.....70&10%
Rolled Raised.....70&10%
Plate Hinges { 8, 10 & 12 in., ₱ ℔.....5¢ / "Providence" } over 12 in., ₱ ℔. ...4¢

Hoes—

Eye—

D. & H. Scovil.....20%
Lane's Crescent Planters Pattern..45&5%
Lane's Razor Blade, Scovil Pattern...30%
Maynard, S. & O. Pat.....45&5%
Sandusky Tool Co., S. & O. Pat. 60&5@ 60&10%
Hubbard & Co., S. & O. Pat.60&5@60&10%
Chattanooga Tool Co., S. & O. Pat..60& 5@60&10%
Grub..... 60@60&10%

Handled—

Garden, Mortar, &c.....70%
Planter's, Cotton, &c.....70%
Warren Hoe.....60%
Magic..... .....₱ doz $4.00

Hog Rings and Ringers—See Rings and Ringers.

Hoisting Apparatus—See Machines, Hoisting.

Hollow-Ware—See Ware, Hollow.

Holders.

Bag.

Sprengle's Pat.....₱ doz $18.....60%

Bit.

Extension,
Barber's, ₱ doz $15.00.....40@40&10%
Ives, ₱ doz $20.00.....60&5@60&10%
Diagonal.. .....₱ doz $24.00, 40%
Angular..... ₱ doz $24.00, 40&5%

File and Tool—

Bals Pat.....₱ doz $4.00; 25%
Nicholson File Holders..... 20%

Hooks—

Cast Iron—

Bird Cage, Sargent's list..... } 60&10&10%
Bird Cage, Reading..... }
Clothes Line, Sargent's list.. }
Clothes Line, Reading list. 60&10@60&10&10%
Ceiling, Sargent's list. .....55&10&10%
Harness, Reading list..55&10@55&10&10%
Coat and Hat, Sargent's list. 55&10@60&10%
Coat and Hat, Reading.50&10@50&10&10%

Wrought Iron—

Cotton.....₱ doz $1.25
Cotton Pat. (N.Y. Mallet & Handle W'ks). 30%
Tassel and Picture (T. & S. Mfg. Co.)...50%
Wrought Staples, Hooks, &c. See Wrought Goods.

Wire—

Wire Coat and Hat, Gem, list April, 1886.....50%
Wire Coat and Hat, Miles', list April, 1886.....50%
Indestructible Coat and Hat.....45%
Wire Coat and Hat, Standard.....45%
Handy Hat and Coat.....50&10%
Steady Ceiling Hooks.....50&10%
Belt. .....80@80&10%

Miscellaneous.

Grass, No. 2, $2.00; No. 3, $2.25; No. 4, $2.50
Nolin's Grass.....₱ doz $2.25
Bush..... .....55@60%
Whiffletree—Patent.....55%
Hooks and Eyes—Malleable Iron. 70@70&10%
Hooks and Eyes—Brass.....60&10&10%
Fish Hooks, American..... 50%
Bench Hooks .....See Bench Stops.

Horse Nails—See Nails, Horse.

Horse Shoes—See Shoes, Horse.

Hose, Rubber—

Competition..... ...75&10@75&10&5%
Standard..... ..70@70&10%
Extra..... ..60@60&10%
N. Y. B. & P. Co., Para.....30&10%
N. Y. B. & P. Co., Extra..... 5%
N. Y. B. & P. Co., Dundee.....60&10&5%

Huskers—

Blair's Adjustable..... ....₱ gr $8.00
Blair's Adjustable Clipper... ..₱ gr 7.00
Hubbard's Solid Steel.....₱ gr 4.50

Indurated Fiber-Ware—See Ware, Indurated Fiber.—

Irons.

Sad—

From 4 to 10, at factory ...₱ 100 ℔, $2.60@$2.75
Self-Heating.....₱ doz $9.00 net
Self-Heating, Tailors'....₱ doz $18.00 net
Gleason's Shield and Toilet. 25%
Mrs. Pott's Irons..... .....40@40&10%
Enterprise Star Irons 40%

Combined Fluter and Sad Iron, ₱ doz, $15.00.....15%
Fox Reversible, Self-Fluter ₱ doz $24.00
Chinese Laundry (N.E. Butt Co.) 8½¢, 15%
New England..... .....6¢, 15%
Mahony's Troy Pol. Irons.....25%
Sensible..... .....20@20&5%
National Self-Heating..... .....30%

Soldering—

Soldering Coppers..... ₱ ℔ 22 @ 23¢
Covert's Adjustable, list Jan. 1, 1886. 35&2%

Irons, Pinking, per doz., 65¢.

Jack Screws—See Screws.

Jacks, Wagon.

Daisy..... .....35%

Kettles— Spun. Stamped.
Brass, 7 to 17 in., ₱ ℔.... 24¢ 21 ¢
Brass larger than 17 in., ₱ ℔..... 26¢ 23½¢
Enameled and Tea—See Hollow-Ware.

Keys—

Lock Asso'n list Dec. 30, 1886...50&10@ 60&5%
Eagle, Cabinet, &c.....33⅓&2%
Hotchkiss' Brass Blanks.....40%
Hotchkiss, Copper and Tinned.....40%
Hotchkiss' Pad. and Cab.....35%
Ratchet Bed Keys.....₱ doz $4.00, 15%
Wollensak Tinned..... .....50&10%

Knife Sharpeners—See Sharpeners, Knife.

Knives.

Butcher, Shoe, &c—

Wilson's Butcher Knives.....25@30%
Ames' Butcher Knives.....25%
Foster Bros.' Butcher, &c..... .....40%
Nichols' Butcher Knives..... .....40&10%
Ames' Shoe Knives..... .....20@25%
Ames' Bread Knives, ₱ doz $1.50, 15@20%
Moran's Shoe and Bread..... .....20%
Hay and Straw.....See Hay Knives.
Table and Pocket.....See Cutlery.
Corn, Auburn Mfg. Co. Western Pat., $2.00
Corn, Auburn Mfg. Co. Crescent.....$3.50

Corn—

Bradley's..... .....10%
Wadsworth's..... .....25%

Drawing—

Witherby..... } .75 @ 75&10 %
P. S. & W ..... }
Mix ..... }
New Haven..... }
Merrill ....60&10@60&10&5%
Douglas..... .....75@75&5%
Watrous..... .....15&10@25%
L. & I. J. White..... .....20&5%
Bradley's..... .....35%
Adjustable Handle..... .....25@33⅓%
Wilkinson's Folding..... .....25@25&5%

Hay and Straw—

Lightning. Mfrs.' price ₱ doz $18.00, 25% But jobbers cut this price freely, often selling at $8 @ $8.50.
Wadsworth's..... .....40&7½@40&10%
Carter's Needle.....₱ doz $11.50@$12.00
Heath's..... .....₱ doz $13.50@14.00
Auburn Hay, Com. and Spear Point..50%
Auburn, Straw..... .....40%
Nolin's Hay .....₱ doz $10.00

Mincing.

Am. (2d quality), ₱ gr., 1 blade blades, $12; 3 blades, $18.....net
Lothrop's..... .....20&10%
Smith's, ₱ doz, Single, $2.00; Double, $3 .....40@45%
Knapp & Cowles. .. ..50&10@60%
Buffalo Adjustable.....₱ doz $3.00 25%
Buffalo Double Adj'table.₱ doz $3.00 25%

Knobs—

Door Mineral..... .....65@68%
Door Por. Jap'd..... .....75@78%
Door Por. Nickel..... .....$2.00@2.25
Door Por. Plated, Nickel.....$2.00@2.25
Drawer, Porcelain.....60&10@60&10&10%
Hemacite Door Knobs.....40&10@50%
Yale & Towne Wood, list Dec., 1885...40%
Furniture Plain.....75¢ gro inch, 10%
Furniture, Wood Screws.....25&10%
Base, Rubber Tip.....70&10&5%
Picture, Judd's.....60&10&10@70%
Picture, Sargent's.....70&10%
Picture, Hemacite..... .....35&5%
Shutter, Porcelain..... .....65&10%
Carriage, Jap..... .....₱ gro 80¢, 60&10%

Ladies,—

Melting, Sargent's.....55&10%
Melting, Reading..... .....35&10%
Melting, Monroe's Pat.....₱ doz $4.00, 40%
Melting, P. S. & W..... .....35&10@40%
Melting, Warner's..... .....30%

Lanterns—

Tubular—

Plain with Guards, ₱ doz.....$4.00@4.25
Lift Wire, with Guards.....$4.50@4.75
Square Plain, with Guards.....$4.00@4.25
Sq. Lift Wire, with Guards.....$4.25@4.50
Without Guards, 25¢ ₱ doz less.

Miscellaneous.

Police, Small, $6.00; Medium, $7.25; Large, $9.75..... .....20@25%

Lawn Mowers—See Mowers, Lawn.

Leaders, Cattle.

Humason. Beckley & Co.'s.....70%
Sargent's..... .....60%&10%
Hotchkiss..... .....30%
Peck, Stow & W. Co..... .....60&10%

Lemon Squeezers—See Squeezers, Lemon.

Lifters, Transom.

Wollensak's:
Class 3 and 4, Bronzed Iron.....50%
Class 3 and 4, Bronze Metal.....25%
Class 3 and 4, Brass..... .....35%
Skylight Lifters..... .....35%
Crown, Eagle and Shield..... .....50%
Reiher's, list Aug. 1, 1889—
Bronzed Iron Rods.....50&10&10&2%
Brass, Real Bronze or Nickel Plate. 30%

Excelsior.....50&10&2
Shaw's..... .....50&10%
Payson's Universal..... .....40@40&10%

Lines—

Cotton and Linen Fish, Draper's 50%
Draper's Chalk..... .....60%
Draper's Masons' Linen, 84 ft., No. 1, $1.25; No. 2, $1.75; No. 3, $2.25; No. 4, $2.75; No. 5, $3.25..... .....25%
Cotton Chalk..... .....55%
Samson, Cotton, No. 4, $2; No. 4½, $2.50; No. 5, $3..... .....10%
Silver Lake, Braided, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50 ₱ gro..... .....25%
Mason's Linen, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50.
Mason's Colored Cotton..... .....45%
Wire Clothes.. Nos. 18 19 20
100 ft. $4 00 $3 50 $3.00
Ventilator Cord, Samson Braided, White or Drab Cotton..₱ doz $7.50, 20%

Locks, &c.—

Cabinet—

Eagle, Gaylord Parker and Corbin... } List March, '84, rev Jan. 1, '85..33⅓&2%
Deitz, Nos. 36 to 39..... .....40%
Deitz, Nos. 51 to 63..... .....40&10%
Deitz, Nos. 86 to 96..... .....30%
Stoddard Lock Co..... .....30&33⅓%
"Champion" Night Latches..... .....40%
Barnes Mfg. Co..... .....40&40&10%
Eagle and Corbin Trunk..... .....25&2%
"Champion" Cab. and Combin...33⅓%
Yale..... .....net prices
Romer's..... .....25%

Door Locks, Latches, &c.

R. & E. Mfg. Co., list Mar. 20, 1889..... } 60&10@60 &10&10
Mallory, Wheeler & Co., list July, '88..... } Much lower net
Sargent & Co., list Aug. 1, '88 } prices
Reading Hardware Co., list Feb. 2, '88..... } often made.
Brittan, Graham & Mathes, list Jan. 1890..... .....60&10&10%
Perkins' Burglar Proof..... .....60&25%
Plate..... .....33⅓&2%
F. Many's "Extension Cylinder" $10.50 ₱ doz.
Barnes Mfg. Co..... .....40@40&10%
Yale..... .....net prices
Deitz Flat Key..... .....30%
L. & C. Round Key Latches..... .....30&10%
L. & C. Flat Key Latches..... .....33⅓&10%
Romer's Night Latches..... .....15%
Shepardson or U. S..... .....35%
Felter or American. ....40&10%
Seed's N. Y. Hasp Lock..... .....25%

Padlocks—

List Dec. 23, '84. ....75@75&10%
Brittan, Graham & Mathes..... 75&10%
Yale Lock Mfg. Co.'s..... .....net prices
Eagle..... .....25&2%
Eureka, Eagle Lock Co..... .....40&2%
Romer's, Nos. 0 to 91..... .....30%
Romer's Scandinavian, &c., Nos. 100 to 505..15%
A. E. Deitz..... .....40%
Champon Padlocks..... .....40%
Hotchkiss..... .....30%
Star..... .....45%
Horseshoe.....₱ doz, $9. 40&40&10%
Barnes Mfg. Co..... .....40@40&10%
Nock's..... .....30%
Brown's Pat..... .....25%
Scandinavian..... .....90@90&10%
E. T. Fraim's Keystone Scandavian: Nos. 119, 120, 130 and 140... ..90&10% Other Nos..... .....65%
Ames Sword Co. up to No. 150..... .....40%
Ames Sword Co. above No. 150..... .....50%

Sash, &c.

Clark's, No. 1, $10; No. 2, $8 ₱ gr. .33⅓%
Ferguson's..... .....33⅓%
Morris and Triumph, list Aug. 16, 1886, 60&2%
Victor..... .....60&10&2%
Walker's..... .....10%
Attwell Mfg. Co..... .....25&33⅓%
Reading..... .....66⅔&10@66⅔&10&10%
Hammond's Window Springs..... .....40%
Common Sense, Jap'd, Cop'd and Br'sed..... .....₱ gr $4.00
Common Sense, Nickel Plated ₱ gr $10.00
Universal..... .....30%
Kempshall's Gravity..... .....60%
Kempshall's Model..... .....60@60&10%
Corbin's Daisy, list Feb. 15, 1886....70%
Payson's Perfect..... .....60@60&10%
Hugunin's Sash Balances..... .....25&5&2%
Hugunin's New Sash Locks..... .....25&5&2%
Stoddard "Practical". 10%
Ives' Patent..... .....60@60&10%
Liesche's, Nos. 100 and 110, ₱ gr $8; 105, $10.00. ....20&10%
Davis, Bronze, Barnes Mfg. Co..... 50%
Champion Safety, list March 1, 1888 55@55&5%
Security..... .....70%
Buckeye..... .....₱ gro $4.80

Lumber Tools—See Tools, Lumber.

Lustro—

Four-ounce Bottles....₱ doz, $1.75; ₱ gross..... .....$17.00

Machines.

Boring—

	Without Augers.	Upright.	Angular.	
Douglas.....	$5.50	$6.75	.....	50%
Snell's, Rice's Pat.	5.50	6.75	...40&10&10	
Jennings	5.50	6.75	...45@45&10	
Other Machines....	2.35	2.75	.....	net
Phillips' Patent with Augers ...	7.00	7.50	... ..	

Fluting.

Knox, 4½-inch Rolls .....$3.25 each } 35%
Knox, 6-inch Rolls..... $3.60 each }
Eagle, 3½-inch Roll. $2.15..... .....35%
Eagle, 5½-inch Roll, $2.85..... .....35%
Crown, 4½ in., $3.50; 6 in., $4.00; 8 in., $6.50 each 35%
Crown Jewel, 6 in ....$3.50 each, 35%
American, 5 in., $3.00; 6 in., $3.40; 7 in., $4.50 each..... .....35%
Domestic Fluter . ...each, $1.50
Geneva Hand Fluter, White Metal ₱ doz $12, 25%
Crown Hand Fluter, Nos. 1, $15.00; 2, $12.50; 3, $10.00. ....30%
Shepard Hand Fluter, No. 85 ₱ doz $15.30..... .....40%

Shepard Hand Fluter, No. 110 ₱ doz $11.00.....40%
Shepard Hand Fluter, No. 96 ₱ doz $8.00.....40%
Clark's Hand Fluter. ₱ doz $15.00.....35%
Combined Fluter and Sad Iron, ₱ doz $15.00.....30%
Buffalo .....₱ doz $10.00.....10%

Hoisting—
Moore's Hand Hoist, with Lock Brake.....20%
Moore's Differential Pulley Block.....40%
Energy Mfg. Co's.....25%

Mallets.

Hickory .....20&10@20&10&10%
Lignumvitæ.....20&10@20&10&10%
B. & L. Block Co., Hickory & L. V. 30@30&10%

Mattocks. Regular list..... .....60&5%

Measures—

Standard Fiberware, No. 1, peck, ₱ dozen, $4; ½-peck, $3.50.

Meat Cutters—See Cutters, Meat.

Mills.

Coffee—
Box and Side, List Jan. 1, 1888.....60&2%
American, Enterprise Mfg Co.20&10@30%
The Swift, Lane Bros..... .....20&10%

Mincing Knives — See Knives, Mincing.

Molasses Gates—See Gates, Molasses.

Money Drawers — See Drawers, Money.

Mowers, Lawn.

Standard List.....50&10%
Quaker City.....60&10%
Enterprise.....60&10%

Muzzles—

Safety.....₱ doz, $3.00, 25%

Nails.

Cut and Wire. See Trade Report.
Wire Nails, Papered.
Association list, July 15, 1889....70&5%
Tack Mfrs.' list.....60&10&10%
Wire Nails, Standard Penny.
Card June 1, '89, base.....$2.90 @ $3.00

Horse—

	Nos. 6	7	8	9	10
Ausable.....	28¢	26¢	25¢	24¢	23¢.

25&10@25&10&10%

Clinton, Fin..					10½ @ 11¢, net
Essex	28¢	26¢	25¢	24¢	23¢.

25&10@25&10&10%

Lyra.....	25¢	23¢	22¢	21¢	20¢.

40&10&5@50%

Snowden	25¢	23¢	22¢	21¢	20¢.

40&10&5@50%

Putnam.....	23¢	21¢	20¢	19¢	18¢.

1000 ℔ in year 10%

Vulcan.....	23¢	21¢	20¢	19¢	18¢..12½&5%
Northwest'n.	25¢	23¢	22¢	21¢	20¢.

25@25&5%

Globe.....	23¢	21¢	20¢	19¢	18¢..20&2½%
Boston.....	23¢	21¢	20¢	19¢	18¢..20&2½%
A. C.....	25¢	23¢	22¢	21¢	20¢.

25&10@33⅓&5%

C. B.-K.....	25¢	23¢	22¢	21¢	20¢.

25₱10@33⅓&5%

Champlain .	28¢	6¢	25¢	24¢	23¢.

35&10&10%

New Haven..	28	26¢	25¢	24¢	23¢.

25&10@25&10&10%

Saranac.....	23¢	21¢	20¢	19¢	18¢...30&10%
Champion ...	25¢	23¢	22¢	21¢	20¢.

10&10&10%

Capewell.....	28¢	26¢	5¢	24¢	23¢.

35&5@35&10%

Star.....	23¢	21¢	ve	19¢	18¢.

10&10@10&12½%

Anchor.....	23¢	21¢	20¢	19¢	18¢.....35%
Western....	23¢	21¢	20¢	19¢	18¢..40&10%
Empire Bronzed.					.....14 ₱ ℔.

Picture—
Brass Head, Sargent's list.....50&10&10%
Brass Head, Combination list.....50&10%
Porcelain Head, Sargent's list.50&10&10%
Porcelain Head, Combination list..40&10%
Niles' Patent.....40%

Nail Pullers.—See Pullers, Nail.

Nail Sets.—See Sets, Nail.

Nut Crackers.—See Crackers, Nut.

Nuts—

Nuts, off list Dec. 18,1889: Square. Hex.

Hot Pressed.....	4¾¢	5¼¢
Cold Punched.....	5 ¢	5½¢

In lots less than 100 ℔, ₱ ℔, add ⅛¢; 1-℔ boxes, add 1¢ to list.

Oakum—
Government.....₱ ℔ 7½@7¾¢
U. S. Navy.....₱ ℔ 6½@6¾¢
Navy.....₱ ℔ 5¾¢@5¾¢

Oilers—

Zinc and Tin .....65@65&10%
Brass and Copper .....50&10@50&10&5%
Malleable, Hammers' Improved, No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₱ doz. 10@10&5%
Malleable, Hammers, Old Pattern, same list 40%
Prior's Pat. or "Paragon" Zinc, 60&10&10%
Prior's Pat. or "Paragon" Brass.....50%
Olmstead's Tin and Zinc.....60%
Olmstead's Brass and Copper 50%
Broughton's Zinc.....60%
Broughton's Brass 50%
Gem P. D. & Co. .....₱ gro. $2

Openers, Can.

Messenger's Comet.....₱ doz $3.00, 25%
American.....₱ gross $3.00
Duplex.....doz 25¢, 15@20%
Lyman's..... .....₱ doz $3.75, 20%
No. 4 French.....₱ doz $2.25, 55&60%
No. 5, Iron Handle.....₱ gr $6.00, 45&50%
Eureka..... .....₱ doz $2.50, 10%
Sardine Scissors.....₱ doz $2.75@3.C.
Star.....₱ doz $2.7[illegible]
Sprague, No. 1, $2.00; 2, $2.25; 3, $2.50 50&10&10%
World's Best, ₱ gross, No. 1, $12.00; No. 2, $24.00; No. 3, $36.00.....50&10%
Universal, ₱ doz $3.00..... .....35&5%
Domestic, ₱ doz $2.50..... .....40%
Champion ₱ doz $2.00 .... 50%

Packing, Steam—
Rubber—

Standard .....60&10@60&10&10%
Extra .....50&10@60%
N. Y. B. & P. Co., Standard ...50&10&5%
N. Y. B. & P. Co., Empire 70%
N. Y. B. & P. Co., Salamander. ₱ ℔ 65¢, 30%
Jenkins' Standard.....₱ ℔ 80¢, 35%

Miscellaneous—
American Packing.....10¢@11¢ ₱ ℔
Russia Packing .....14¢ ₱ ℔
Italian Packing .....13¢@14¢ ₱ ℔
Cotton Packing ....15¢@17¢ ₱ ℔
Jute.....7¢@8¢ ₱ ℔

Padlocks—See Locks.

Parers.

Apple.
Advance.....₱ doz $4.75
Antrim Combination.....₱ doz 5.50
Baldwin.....₱ doz 5.25
Champion.....₱ doz 7.25
Daisy.....₱ doz 4.00
Eureka, 1888.....each 17.00
Family Bay State.....₱ doz 12.00
Favorite .....₱ doz 5.00
Gem.....₱ doz 5.25
Gold Medal.....₱ doz 4.00
Ideal.....₱ doz 4.00
Improved Bay State.....₱ doz 30.00
Little Star.....₱ doz 4.50
Monarch.....₱ doz 13.50
New Lightning.....₱ doz 5.50
Oriole.....₱ doz 4.00
Penn.....₱ doz 4.00
Perfection.....₱ doz 4.00
Pomona.....₱ doz 4.00
Rocking Table.....₱ doz 6 00
Turntable.....₱ doz 4.50
Victor.....₱ doz 13.50
Waverly.....₱ doz 4.00
White Mountain.....₱ doz 4.50
72.....₱ doz 4.25
76.....₱ doz 5.75
78.....₱ doz. 6.50

Potato—
White Mountain .....₱ doz $5.00@5.50
Antrim Combination.....₱ doz $8.00
Hoosier..... .....₱ doz $13.50

Pails.

Galvanized Iron—

Quarts	10	12	14
Hill's Light Weight, ₱ doz.	$2.75	3.00	3.25
Hill's Heavy Weight, ₱ dz.	3.00	3.25	3.75
Whiting's.....	2.75	3.00	3.25
Sidney Shephard & Co....	2.94	3.15	3.27
Iron Clad	2.50	2.75	3.00
Fire Buckets.....	2.75	3.25	3.50

Buckets, see Well Buckets.

Indurated Fibre Ware—25%
Star Pails, 12 qt .....₱ doz $6.00
Fire, Stable and Milk, 14 qt ..₱ doz $7.80

Standard Fibre Ware—

	Plain.	Decr'd
Water Pails, 12 qt., per doz.	$4.00	$4.50
Dairy Pails, 14 qt., per doz.	4.50	5.00
Fire Pails, No. 1, 12 qt. per doz	4.50	
Fire Pails, No. 2, 14 qt. per doz	5.00	
Sugar Pails.....	6.00	6.50
Horse Pails.....	5.00	
Buggy Pails.....	4.00	
Slop Jars (bal. trap).....	8.00	9.00
Chamber Pails, 14-qt.....	6.50	7.50

Pans.

Dripping.
Small sizes. ....₱ ℔ 6¼¢
Large sizes..... ..... ₱ ℔ 5¾¢

Fry—
Standard List:

No.....	0	1	2	3	4
₱ doz..	$3.00	$3.75	$4.25	$4.75	$5.25
No.....	5	6	7	8	
₱ doz.....	$6.00	$7.00	$8.00	$9.00	

Polished, regular goods.....70&10%
Acme Fry Pans .....60&10%

Paper and Cloth—

Sand and Emery—
List April 19, 1886.....50@50&10%
Sibley's Emery and Crocus Cloth.....30%

Pencils—

Faber's Carpenters'..... ..high list 50%
Faber's Round Gilt.....₱ gro $5.25
Dixon's Lead..... .....₱ gro $4.50
Dixon's Lumber.....₱ gro $6.75
Dixon's Carpenters' ....40&10%

Picks—

Railroad or Adze Eye, 5 to 6, $12.00; 6 to 7, $13.00.....60 @ 60&5%

Picture Nails.—See Nails, Picture.

Pinking Irons.—See Irons, Pinking.

Pipe, Wrought Iron—
List September 18, 1889.

⅛ and under, Plain	47½%
⅛ and under, Galvanized	40%
¼ and over, Plain.....	60%
¼ and over, Galvanized	47½%

Boiler Tubes, Iron.

1½ and under.....	45%
2 to 4 inch.....	50%
4-inch and larger.....	52½%

Pins.

Box—
Humason, Beckley & Co.'s.....60&10%
Sargent & Co's....$17 and $18.....60&10%
Peck, Stow & W. Co... 50&10@50&10&5%

Curtain—
Silvered Glass.....net
White Enamel.....net

Escutcheon,
Iron, list Nov. 11, 1885..50&10@50&10&5%
Brass.....60@60&5%

Planes and Plane Irons—

Wood Planes—
Molding.....45&2%
Bench, First Quality.....55&2%
Bench, Second Quality.....60&2%
Bailey's (Stanley R. & L. Co.).....40&10%

Iron Planes—
Bailey's (Stanley R. & L. Co.).....40@10%
Miscellaneous Planes (Stanley R. & L. Co.) .....20&10%
Victor Planes (Stanley R. & L. Co.).20&10%
Steer's Iron Planes.....35@35&5%
Merrien Mal. Iron Co.'s.30&10@30&10&10%
via's Iron Planes .30&10@30&10&10%
Birmingham Plane Co.....50@50&5%
Gage Tool Co.'s Self-Setting.....20&10%
Chaplin's Iron Planes .....40@40&5%
Sargent's .....30&10@30&10&10%

Plane Irons—
Butcher's.....$5.00@$5.25 to £
Buck Bros 30%
Auburn "Thistle..... .....
Ohio..... .....
Landusky..... .....} 35&2%
S. & I. J. White.....25%

Plates.

Felloe .....₱ ℔ 6¢@6½¢

Pliers and Nippers—

Button's Patent.....30&10@40%
Hall's No. 2, 5 in., $13.50; No. 4, 7 in. $21.00 ₱ doz .....20&10@33⅓%
Humason & Beckley Mfg. Co. .50@50&10%
Gas Pliers.....60%
Gas Pliers, Custar's Nickel Plated..60&5%
Eureka Pliers and Nippers 40%
Russell's Parallel. 25%
P. S. & W. Cast Steel..... .....50%
P. S. & W. Tinners' Cutting Nippers, add 5% dis 10%
Carew's Pat. Wire Cutters.....20%
Morrill's Parallel, ₱ doz, $12.00...30&5%
Cronk's 8 in., $15.00; 10 in. $21.00, 40@40&5%

Plumbs and Levels—

Regular List .....70&10@70&10&10%
Disston's. ....45&10%
Pocket Levels.....70&10@70&10&10%
Davis Iron Levels.....30%
Davis' Inclinometers .....10&10%

Poachers.

Egg.
Buffalo Steam Egg Poachers, ₱ doz, No. 1, $6.00; No. 2, $9.00.....25%

Polish, Metal.

Prestoline.....20&10%
Prestoline Paste 33⅓%
Gaston's Silver Compound.....33⅓%

Pokes, Animal—

Bishop's I. X. L.....₱ doz $6.00
Bishop's O. K..... .....₱ doz $5.25
Bishop's Pioneer.....₱ doz $3.75
Bishop's American.... .....₱ doz $2.75

Polish, Stove.

Joseph Dixon's.....₱ gro $6.00,10%
Gem.....₱ gro $4.50, 10%
Gold Medal.....₱ gro $6.00, 25%
Mirror .....₱ pro $6.00, —%
Lustro.....₱ gro $4.75
Ruby.....₱ gro $3.75
Rising Sun, 5 gro lots .....₱ gro $5.50
Dixon's Plumbago.....₱ ℔ $5.00
Boynton's Noon Day, ₱ gro 13.00
Parlor Pride Stove Enamel..₱ gro 3 cans
Yates' Liquid, 2 3 5 10 gal....8¢
₱ gal ...$0.90 .80 .70 .60
Yates Standard Paste Polish, 10-℔ cans, ₱ ℔ 15¢
Jet Black .....₱ gro $3.50
Japanese.....₱ gro $3.50
Fireside.....₱ gro $2.50
Diamond O. K. Enamel.....₱ gro $19.00
Bonnell's Liquid Stove Polish..₱ gro $9.00
Bonnell's Paste Stove Polish..₱ gro $6.00
Black Eagle Benzine Paste, 5 and 10 ℔ cans ....12½¢
Black Jack Water Paste, 5 and 10 ℔ cans ....12½¢
Nickel Plate Paste .....₱ gro $6.00

Poppers, Corn—

Round or Square, 1 qt..₱ gr $10.00@10.50
Round or Square, 1½ qt..₱ gr $15@15.50
Round or Square, 2 qt..₱ gr $18.50@19.00

Post Hole and Tree Augers and Diggers—See Diggers, Post Hole, &c.

Potato Parers—See Parers, Potato.

Pots.

Glue—
Tinned.....40%
Enameled.....40&5%
Family, Howe's "Eureka".....40%
Family, L. F. C.'s "Handy" 50%

Presses.

Fruit and Jelly—
Enterprise Mfg. Co.....20&10@30%
Henis .....₱ doz $2.50
Shepard's Queen City 40%

Pruning Hooks and Shears.—See Shears.

Pullers.

Nail.
Curtiss Hammer.....₱ doz $9.00
Giant, No. 1.....₱ doz. $18.00, 10%
Giant, No. 2.....₱ doz, $15.00, 10%
Pelican.....₱ doz, $9.00, 25%

Pulleys—

Hot House, Awning, &c.....60&10%
Japanned Screw..... ..... 60&10%
Brass Screw .....60&10%
Japanned Side.....66⅔&10%
Japanned Clothes Line.....60&10%
Empire Sash Pulley.....55@60%
Moore's Sash, Anti-Friction.....50%
Hay Fork, Solid Eye, $4.00; Swivel, $4.50.....50&10@50&10&5%
Hay Fork, "Anti-Friction," 5 in. Solid, $5.70 .....50%
Hay Fork, "F" Common and Pat. Bushed 20%
Hay Fork, Tarbox Pat. Iron.....20%
Hay Fork, Reed's Self-Lubricating ...60%
Shade Rack 45%
Tackle Blocks.....See Blocks
Moore's Anti-Friction 5 in. Wheel, ₱ doz $12.00..... 40

Pumps—

Cistern, Best Makers .....60@60&10%
Pitcher Spout, Best Makers.....67½@70%
Pitcher Spout, Cheaper Goods.70@70&5%

Punches—

Saddlers' or Drive, good, ₱ doz...60@65%
Bemis & Call Co.'s Cast Steel Drive..50&5%
Bemis&Call Co's Springfield Socket.50&5%
Spring, good quality....₱ doz $2.50@2.60
Spring, Leach's Pat.....15%
Bemis & Call Co.'s Spring and Check ..40%
Solid Tinners', P.S.&W.Co.,₱ doz$1.44, 55%
Tin'rs' Hollow Punches P.S.&W.Co.20&2%
Rice Hand Punches 15%
Avery's Revolving.....40%
Avery's Saw-Set and Punch. See Saw Sets.

Rail—

Sliding Door. Wr't Brass.₱ ℔ 35¢.....15%
Sliding Door, Bronzed Wr't Iron..₱ ft. 7¢
Sliding Door, Iron, Painted, ₱ foot 4¢, 40%
Barn Door, Light. In. ½ ¾ 1
Per 100 feet.....$2.00 2.50 3.10, 10%
B. D. for N. E. Hangers—
Small. Med. Large.
Per 100 feet....$2.15 2.70 3.25..net
Terry's Steel Rail, ₱ foot.....4½¢
Victor Track Rail, 7¢ ₱ foot.....50&2%
Carrier Steel Rail, ₱ foot .....4½¢
Moore's Wrought Iron.....25%

Rakes—

Cast Steel, Association goods 70%
Cast Steel, outside goods 60&10&10@70&5%
Malleable..... 70@70&5%
Gibbs Lawn Rake.....$12.00, 50&1
Canton Lawn Rake..... $9.00, 50&1
Ft. Madison Prize Bow Brace and Peerless 65%
Fort Madison Steel Tooth Lawn Rake, $6.00..... .....25%

Razor

J. R. Torrey Razor Co 20%
Wostenholme and Butcher, $10.00 to £, 10%
Jordan's AAA1, list Nov. 1, 1889.....50%
Jordan's Old Faithful, list Nov. 1, '89.50%
Electric.....List net

Razor Strops—See Strops, Razor.

Rings and Ringers.

Bull Rings—
Union Co. Nut 55%
Sargent's.....66⅔&10@70&5%
Hotchkiss' low list.....30%
Humason, Beckley & Co.'s. 70%
Peck, Stow & W. Co's. .50&10@50&10&10%
Ellrich Hdw. Co., White Metal, low list. 50@50&10%

Hog—
Top of the Hill Ringers.....₱ doz $4.25
Hill's Improved Ringers. . . .₱ doz $4.25
Hill's Old Style Ringers.....₱ doz $2.75
Hill's Tongs. .....₱ doz $4.50
Hill's Rings..... .....₱ doz bxs $2.15@2.25
Perfect Rings.....₱ doz bxs $1.60@1.70
Perfect Ringers.....₱ doz $2.15@$2.25
Blair's Hog Ringers.....₱ doz $2.25@2.50
Blair's Hog Rings.....₱ doz 90¢@$1.00
Champion Ringers..... ... ₱ doz $2.00
Champion Rings, Double.....₱ doz $2.25
Brown's Ringers.....₱ doz $2.00
Brown's Rings.....₱ doz $1.25@1.30

Rivets and Burrs—

Iron, list Nov. 17, '87.....40%
Copper.....50@50&10%

Rivet Sets—See Sets.

Rods—

Stair, Brass .....25&2%
Stair, Black Walnut .. ..₱ doz 40¢

Rollers—

Barn Door, Sargent's list .....60&10&10%
Acme Moore's Anti-Friction.....55%
Union Barn Door Roller 70%

Rope—

Manufacturers' prices:
Manila...½ in. and larger ₱ ℔ 15 ¢
Manila.....⅜ in. ₱ ℔ 15½¢
Manila.....½ and 5-16 in. ₱ ℔ 15¾¢
Manila, Tarred Rope.....₱ ℔ 14½¢
Manila, Hay Rope.....₱ ℔ 15 ¢
Sisal...½ inch and larger ₱ ℔ 12 ¢
Sisal.....⅜ in. ₱ ℔ 12½¢
Sisal.....½ and 5-16 in. ₱ ℔ 12¾¢
Sisal, Hay Rope..... ₱ ℔ 12 ¢
Sisal, Tarred Rope.....₱ ℔ 11½¢
Sisal, Medium Lathe Yarn.₱ ℔ 11 ¢
Cotton Rope.....₱ ℔ 15@18¢ net
Jute Rope.....₱ ℔ 7¾¢

1½% for cash in 10 days.

Wire—
List May 1, 1886.
Iron.....30%
Iron, Galvanized.....27½%
Cast Steel.....35%

Rules—

Boxwood.....80&10&10@80&10&10&5%
Ivory..... .....50@50&10%
Starrett's Rules and Straight Edges, Steel..... .....25&10%

Sad Irons—See Irons, Sad.

Sand and Emery Paper and Cloth—See Paper and Cloth, Sand and Emery.

Sash Cord—See Cord, Sash.

Sash Locks—See Locks, Sash.

Sash Weights—See Weights, Sash.

Sausage Stuffers or Fillers—
See Stuffers or Fillers, Sausage.

Saws—

Disston's Circular.....45@45&5%
Disston's Cross Cuts..... ....45@45&5%
Disston's Hand 25@25&5%

Extras some times given by jobbers.

Atkins' Circular Shingle an Heading 50&10%
Atkins' Silver Steel Diamond X Cuts ₱ foot 70¢
Atkins' Special Steel Dexter X Cuts ₱ foot 50¢
Atkins' Special Steel Diamond X Cuts ₱ foot 30¢
Atkins' Champion and Electric Tooth X Cuts ₱ foot 24@25¢
Atkins' Hollow Back X Cuts. ₱ foot 18¢
Atkins' Mulay, Mill and Drag.....40&10%
Atkins' One-Man Saw, with handles, ₱ foot 32¢
W. M. & C., Hand.....30&5@30&10%
W. M. & C., Champion X Cuts, Regular ₱ foot 24@26¢
W. M. & C. X Cuts, Thin Back, ₱ foot 27¢@29¢
Peace Circular and Mill.....45&10%
Peace Hand Panel and Rip 20&10@20&10&10%
Peace Cross Cuts, Standard...₱ foot 25¢
Peace Cross Cuts, Thin Back ₱ foot 27@28¢
Richardson's Circular and Mill 45@45&10%
Richardson's X Cuts, No. 1, 30¢; No. 2, 27¢; No. 3, 24¢

Hack Saws—
Griffin's, complete.....40&10@50%
Griffin's Hack Saw, Blades....40&10@50%
Star Hack Saws and Blades.....25%
Diamond Hack Saws and Blades.....25%
Eureka and Crescent.....25¢

Scroll—
Lester, complete, $10.00.....25%
Rogers, complete, $4.00.....25%
Barnes' Builders' and Cabinet Makers', $15.....25%
Barnes' Scroll Saw Blades.....35%

Saw Frames—See Frames, Saw.

Saw Sets—See Sets, Saw.

Saw Tools—See Tools, Saw.

Sets.

Awl and Tool.
Aiken's Sets, Awls and Tools, No. 20, ₱ doz $10.00.....55&10%
Fray's Adj. Tool Hdls., Nos. 1, $12; 2, $18; 3, $12; 4, $9.....25@25&10%
Miller's Falls Adj. Tool Hdls., Nos. 1, $12. 2, $18.....25%
Henry's Combination Haft...₱ doz $6.50
Brad Sets, No. 42, $10.50; No. 43, $12.50...70&10&5%
Stanley's Excelsior: No. 1, $7.50; No. 2, $4.00; No. 3, $5.50.....30&10%

Nail—
Square.....₱ gr., $4.00@$4.25
Round.....₱ gr. $3.25
Buck Bros.....27½%
Cannon's Diamond Point...₱ gr., $12, 20%

Rivet.
Regular list.....50&10%

Saw—
Stillman's Genuine...₱ doz $5.00@7.75, 40&5%
Stillman's Imita.....₱ doz $3.25@5.25, 40&5@40&10%
Common Lever.....₱ doz $2.00, 40&5%
Morrill's No. 1, $15.00; Nos. 3&4, $24.00. 40&10@50%
Leach's...No. 0, $8.00; No. 1, $15, 15@20%
Nash's.....20&10@20&10&10%
Hammer, Hotchkiss.....$5.50, 10%
Hammer, Bemis & Call Co.'s new Pat. 30&5%
Bemis & Call Co.'s Lever and Spring Hammer.....30&5%
Bemis & Call Co.'s Plate.....10%
Bemis & Call Co.'s Cross Cut 12½%
Aiken's Genuine.....$13.00, 50&10%
Aiken's Imitation. .....$7.00, 55&5%
Hart's Pat. Lever.....20%
Disston's Star, $9, No. 15, $5.50; 20& 10@20&10&10%
Atkin's Lever, ₱ doz No. 1, $6.00; No. 2, $9.00
Atkin's Criterion.....₱ doz $7.50
Croissant (Keller), No. 1, $15.00; No. 2, $24.00.....40&10%
Avery's Saw Set and Punch.....50%
Chieftain H. R. Co.'s Superior ₱ doz $15, 50%

Scales—

Hatch, Counter, No. 171, good quality, ₱ doz $21.00
Hatch, Tea, No. 161....₱ doz $6.75@$7.00
Union Platform, Plain.....$2.10@2.20
Union Platform, Striped.....$2.20@2.30
Chatillon's Grocers' Trip Scales 50%
Chatillon's Eureka.....25%
Chatillon's Favorite.....40%
Family, Turnbulls.....30@30&10%
Riehle Bros.' Platform.....40%

Scale Beams—See Beams, Scale.

Scissors, Fluting.....45%

Scrapers—

Adjustable Box Scraper (S. R. & L. Co.) $6.50.....30&10%
Box, 1 Handle.....₱ doz $4.00, 10%
Box, 2 Handle.....₱ doz $6.00, 10%
Defiance Box and Ship.....20&10%
Foot.....50&10@60%
Ship, Common .....₱ doz $3.50 net
Ship, R. I. Tool Co.....10%

Screen Window and Door Frames—See Frames.

Screw Drivers—See Drivers, Screw.

Screws.

Cork—
Humason & Beckley Mfg. Co..40@40&10%
Williamson's.....33⅓@33⅓&5%
Rowe Bros & Hulbert.....35%

Wood—
List March 1, 1889.
Flat Head Iron.....50%
Round Head Iron.....40%
Flat Head Brass.....45%
Round Head Brass.....35%
Flat Head Bronze.....45%
Round Head Bronze ..35%
} Extra 5 @ 10 % often given.

Machine—
Flat Head, Iron.....55%
Round Head, Iron.....50%

Bench and Hand—
Bench, Iron.....55&10@55&10&10%
Bench, Wood, Beech.....₱ doz $2.25
Bench, Wood, Hickory.....20&10%
Hand, Wood .....25&10@25&10&5%
Lag, Blunt Point, list Jan. 1, 1890. 75&10%
Coach and Lag, Gimlet Point, list Jan. 1, 1890.....75%
Bed .....25&5%
Hand Rail, Sargent's.....60%&10%
Hand Rail, H. & B. Mfg. Co...70&10@75%
Hand Rail, Am. Screw Co.....75%
Jack Screws, Millers Falls list..50@50&5%
Jack Screws, P. S. & W.....35%
Jack Screws, Sargent..60&10@60&10&5%
Jack Screws Stearns'.....40@40&10%

Scroll Saws—See Saws, Scroll.

Scythe Snaths—See Snaths, Scythe.

Sharpeners, Knife.

Parkin s.
Applewood Handles...₱ doz $6.00, 40%
Rosewood or Cocobolo. ₱ doz $9.00, 40%

Shaves, Spoke.

Iron.....45%
Wood.....30%
Bailey's (Stanley R. & L. Co.).....40&10%
Stearns'.....20&10@30%
Cincinnati.....25&10%

Shears—

American (Cast) Iron...75&10@75&10&5%
Pruning...See Pruing Hooks and Shears.
Barnard's Lamp Trimmers...₱ doz $3.75
Tinners'.....20&2%
Seymour's, List, Dec., 1881. 60&10&10@60&10&10&5%
Heinisch's, List, Dec., 1881. 60&10&10@60&10&10&5%
Heinisch's Tailor's Shears.....33⅓%
First quality C. S. Trimmers..80@80&10%
Second quality C. S. Trimmers. 80&10@80&10&10%
Acme Cast Shears.....10&10%
Diamond Cast Shears.....10%
Clipper.....10&10%
Victor Cast Shears.....75&10@75&10&5%
Howe Bros. & Hulbert, Solid Forged Steel.....40%
Chicago Drop Forge & F. Co., Solid Steel Forged.....60%
Clauss Shear Co., Japanned.....70%
Clauss Shear Co., Nickeled, same list. 60%
Electric .....List net

Pruning Shears and Hooks.
Disston's Combined Pruning Hook and Saw.....₱ doz $18.00, 20&10%
Disston's Pruning Hook, ₱ doz $12.00, 20&10%
E. S. Lee & Co.'s Pruning Tools.....40%
Pruning Shears, Henry's Pat, ₱ doz $3.75@4.00 net
Henry's Pruning Shears, ₱ doz $4.25@ 4.50 net
Wheeler, M. & C. Co.'s Combination, ₱ doz $12.00, 20%
Dunlap's Saw and Chisel, ₱ doz $8.50, 30%
J. Mallinson & Co., No. 1, $5.25; No. 2 7.25
P., S. & W. Co.....60%

Tinners', &c.—
Shears and Snips (P. S. & W.).....20@25%
Punches, see Punches.
Snips, J. Mallinson & Co.....33⅓%

Sheaves—

Sliding Door—
M. W. Co., list July, 1888...50&10@60&5%
R. & E., list Dec. 18, 1885.....55&20%
Corbin's list.....60&10&2%
Patent Roller.....60&10&2%
Patent Roller, Hatfield's.....75%
Russell's Anti-Friction, list Dec. 18, 1885.....60&2%
Moore's Anti-Friction.....50%

Sliding Shutter—
R. & E. list Dec. 18, 1885.....60&10&2%
Sargent's list.....60&10%
Reading list.....60&10&10%

Ship Tools—

L. & I. J. White.....20&5%

Shoes, Horse, Mule, &c.—

Horse—
Burden's, Perkins', Phœnix, at factory. $4.00

Mule—
Add $1 ₱ keg to above prices.

Ox, Wrought—
Ton lots.....₱ ₺ 9¢
1000 ₺ lots.....₱ ₺ 9½¢
500 ₺ lots.....₱ ₺ 10¢

Shot—

(Eastern prices 2¢ off, cash, 5 days.
Drop, ₱ bag, 25 ₺.....$1.19
Drop, ₱ bag, 5 ₺.....29
Buck and Chilled, ₱ 25-₺ bag 1.44
Buck and Chilled, ₱ 5-₺ bag ..... .34

Shovels and Spades—

Ames' Shovels, Spades, &c., list Nov. 1, 1885.....20%
NOTE.—Jobbers frequently give 5@7½% extra on above.
Griffith's Black Iron .....50&10%
Griffith's C. S.....60@60&10%
Griffith's Solid C. S. R. R. Goods.....20%
Old Colony (Sanford Fork & Tool Co).35%
St. Louis Shovel Co.....20@20&7½%
Hussey, Binns & Co.....15@25%
Hubbard & Co.....20@20&7½%
Lehigh Mfg. Co.....50&10%
Payne Pettebone & Son, list January, 1886.....50%
Remington's (Lowman's Pat.).30&10@40%
Rowland's, Black Iron.....50&10%
Rowland's Steel.....60&5@60&10%

Shovels and Tongs—

Iron Head.....60&10@60&10&5%
Brass Head.....60&10&10%

Sieves—

Mann's Tin Rim.....50&25%
Buffalo Metallic, S. S. & Co.....50&25%
Shaker (Barler's Pat.) Flour Sifters... ₱ doz $2.00; ₱ gr $21.60
Electric.....₱ gr $21.00
A. & W. Sifters.....₱ doz$ 2.00
Hunter's.....₱ doz $2.00
Smith's Adjustable Sifters....₱ doz $2.00
Smith's Adjustable Milk Strainer, ₱ doz $2.00
Smith's Adjustable T. & C. Strainer, ₱ doz. $1.25

Sieves, Wooden Rim—

	Iron.	Plated.
Mesh 18, Nested, ₱ doz..	80¢	$1.00
Mesh 20, Nested, ₱ doz..	95¢	1.10
Mesh 24, Nested, ₱ doz..	$1.15	1.25

Skeins, Thimble—

Western list.....75&5@75&10%
olumbus Wrt. Steel, list Jan. 3, 1889.....45&10%
Coldbrookdale Iron Co.....50&10%
Utica P. S. T. Skeins.....60%
Utica Turned and Fitted.....35%

Slates—

School, by case..... .50@50&10%

Snaps, Harness, &c.—

Anchor (T. & S. Mfg. Co.).....65%
Fiten's (Bristol).....50&10%
Hotchkiss.....10%
Andrews.....50%
Sargen. s Patent Guarded.....70&10&10%
German, new list.....40&10%
Covert.....50&2%
Covert, New Patent.....50&5&2%
Covert, New R. E.....60&10&2%
Covered Spring.....60&10&10%

Snaths, Scythe.

List.....50&5&2@50&10&2%

Soldering Irons—See Irons, Soldering.

Spittoons, Cuspidors, &c.

Standard Fiberware—
Cuspidors, 8½-inch, ₱ doz., No. 5, $8; No. 5X $9.
Spittoons, Daisy, 8-inch, No. 1, $4; 10 and 11 inch, $6.

Spoke Shaves—See Shaves, Spoke.

Spoke Trimmers—See Trimmers, Spoke.

Spoons and Forks—

Tinned Iron—
Basting, Cen. Stamp. Co.'s list. ..70&10%
Solid Table and Tea, Cen. Stamp. Co.'s list.....70&10%
Buffalo S. S. & Co.....33⅓&2%

Silver-Plated—(4 mos. or 5% cash 30 days).
Meriden Brit. Co., Rogers....40, 15, 10&5%
C. Rogers & Bros.....40, 15, 10&5%
Rogers & Bro.....40, 15, 10&5%
Reed & Barton.....40&10%
Wm. Rogers Mfg. Co...40, 15, 10, 5&5%
Simpson, Hall, Miller & Co..40, 15, 10&5%
Holmes & Edwards Silver Co.....40, 15, 10, 5&5%
L. Boardman & Son.....60%

Miscellaneous.
Holmes & Edwards Silver Co.:
No. 67 Mexican Silver.....50&10&5%
No. 30 Silver Metal.....50&10&5%
No. 24 German Silver.....50&10&5%
No. 50 Nickel Silver.....50%
No. 49 Nickel Silver.....50&10
German Silver.....50&50&5
German Silver, Hall & Elton..50&5% cash
Nickel Silver.....50&5&50&10&5% cash
Britannia.....60%
Boardman's Nickel Silver....50&5% cash
Boardman's Britannia Spoons, case lots.....60&5% cash

Springs, Door.

Torrey's Rod, regular size....₱ doz $1.30
Gray's, ₱ gr., $20.00.....20%
Bee Rod ₱ gr., $20.00.....20%
Warner's No. 1, ₱ doz, $2.50; No. 2, $3.30.....40&10&5%
Gem (Coil), list April 19, 1886.....10%
Star (Coil), list April 19, 1886.....20%
Victor (Coil).....60&60&10%
Champion (Coil).....60&10@60&10&10%
Philadelphia, 5 in., $5.00; 8 in., $7.75.. %
Cowell's....No. 1, ₱ doz, $18.00; No. 2, $15.00.....50%
Rubber, complete, ₱ doz, $4.50...55&10%
Hercules.....50%
Shaw Door Check and Spring.25@30@35%
Elliptic, Concord, Platform and Half Scroll.....60@60&5%
Cliff's Bolster Springs.....25¢

Squares—

Steel and Iron.....} 75&10@80%,
Nickel-Plated.....} full cs. ex. 10%
Try Square and T Bevels...60&10@60&10&10%
Disston's Try Square and T Bevels.45&10%
Winterbottom's Try and Miter....30&10%
Starrett's Micrometer Caliper Squares. 25%
Avery's Flush Bevel Squares.....40%
Avery's Bevel Protractor.....50%

Squeezers.

Fodder.—
Blair's.....₱ doz $2.00
Blair's "Climax".....₱ doz $1.25

Lemon—
Porcelain Lined, No. 1....₱ doz $6.00, 25&30%
Wood, No. 2.....₱ doz $3.00, 35%
Wood, Common.....₱ doz $1.70@$1.75
Dunlap's Improved .....₱ doz $3.75, 20%
Sammis....No. 1, $5.00; No. 2, $9; 12, $18 ₱ doz.....25&10%
Jennings' Star.....₱ doz $2.50
The Boss.....₱ doz $2.50
Dean's..Nos. 1, ₱ doz $6.50; 2, $5.35; 3, $4.90
Little Giant.....50@50&5%
King.....40&5%
Hotchkiss Straight Flash....₱ doz $12.00

Standard Fiber Ware—See Ware, Standard Fiber.

Staples.

Blind—
Barbed, ½ in. and larger.....₱ ₺ 7½@8¢
Barbed, ⅝ in.....₱ ₺ 8½@9¢
Fence Staples, Galvanized. } Same price
Fence Staples, Plain..... } as B'rb Wire. See Trd. Rep.

Steelyards.....40&10@50%

Stocks and Dies—

Blacksmith's
Waterford Goods.....30&5@30&10%
Butterfield's Goods.....30&5@30&10%
Lightning Screw Plate.....25@30%
Reece's New Screw Plates....33⅓&5&40%
Reversible Ratchet.....30 %
Gardner.....25%

Stops, Bench.

Morrill's.....₱ doz $9, 50%
Hotchkiss's.....₱ doz $5, 10@10&10%
Weston's, No. 1, $10; No. 2, $9.25&10&5%
McGill's.....₱ doz $3.....10%
Cincinnati.....25&10%

Stone—

Hindostan No. 1, 3¢; Axe, 3¼¢; Slips No. 1, 4½¢
Sand Stone.....₱ ₺ 2½¢
Washita Stone, Extra.....₱ ₺ 19@20¢
Washita Stone, No. 1.....₱ ₺ 14@15¢
Washita Stone, No. 2.....₱ ₺ 10@11¢
Washita Slips, No. 1, Extra..₱ ₺ 36@38¢
Washita Slips, No. 1.....₱ ₺ 24@25¢
Arkansas Stone, No. 1, 4 to 6 in₱ ₺ $1.50
Arkansas Stone, No. 1, 6 to 9 in₱ ₺ $1.85
Turkey Oil Stone, 4 to 8 in.....₱ ₺ 40¢
Turkey Slips.....₱ ₺ $1.00@1.50
Lake Superior, Chase.....₱ ₺ 16¢
Lake Superior Slips, Chase...₱ ₺ 31@32¢
Seneca Stone, Red Paper Brand....₱ ₺ 18@20¢
Seneca Stone, High Rounds..₱ ₺ 20@25¢
Seneca Stone, Small Whets..₱ gro $24.00

Stove Polish—See Polish, Stove.

Stretchers, Carpet.

Cast Steel, Polished.....₱ doz $2.25
Cast Iron, Steel Points.....₱ doz 80¢
Socket.....₱ doz $1.75
Millard's.....25@25&10%

Strops, Razor—

Genuine Emerson.....60@60&5%
Imitation " ....₱ doz $2.00, 20&10&5%
Torrey's.....20%
Badger's Belt and Com.....₱ doz $2.00
Lamont Combination.....₱ doz $4.00
Jordan's Pat Padded, list Nov. 1,'89.50%
Electric.....List net

Stuffers or Fillers, Sausage—

Miles' "Challenge," ₱ doz $20, 50&50&5%
Perry ..₱ doz, No. 1, $15.00; No. 0, $21.00.....50&5&50&10%
Draw Cut No. 4, each $30.00.....20%
Enterprise Mfg. Co.....20&10@30%
Silver's.....40&10%

Sweepers, Carpet.

Bissell No. 5.....₱ doz $17.00
Bissell No. 7 New Drop Pan..₱ doz $19.00
Bissell, Grand.....₱ doz $36.00
Grand Rapids.....₱ doz $24.00
Crown Jewel, No. 1, $18.00; No. 2, $19.00; No. 3, $20.00
Magic.....₱ doz $15.00
Jewel.....₱ doz $17.00
Improved Parlor Queen, Nickeled..₱ doz $27.00
Japanned..₱ doz $24.00
Excelsior .....₱ doz $22.00
Garland .....₱ doz $18.00
arlor Queen.....₱ doz $24.00
Housewife's Delight.....₱ doz $15.00
Queen.....₱ doz $16.00
Queen, with band..₱ doz $18.00
King.....₱ doz $30.00
Weed, Improved.....₱ doz $18.00
Hub.....₱ doz $16.00
Cog-Wheel.....₱ doz $16.00
Conqueror .....₱ doz $22.00
Easy .....₱ doz $22.00
Monarch.....₱ doz $22.00
Goshen.....₱ doz $21.00
Advance.....₱ doz $18.00
Ladies' Friend, No. 1, ₱ doz, $15.00; No. 2.....₱ doz $16.00
American.....₱ doz $15.00
Grand Republic.....₱ doz $35.00

Tacks, Brads, &c.—

Carpet Tacks—
List Oct. 19, 1889, extra 10&2 % cash.
American Iron, Blued.....70%
American Iron, Tinned or Cop'd...70%
Steel, Plain or Bright.....70%
Steel Tinned or Coppered.....70%
Swedes Iron, Blued.....70%
Swedes Iron, Tinned or Cop'd 70%
American Iron Cut Tacks.....67½%
Swedes Iron Upholst'rs' Tacks, S.S...70%
Swedes Iron Upholst'rs' Tacks, Tinned, S.S.....70%
Swedes Iron Card and Upholsterers' Tacks, Lanc.....66⅔%
Swedes Iron Card and Upholsterers' Tacks, Tinned, Lanc.....66⅔%
Gimp and Lace Tacks Lanc., Swedes Iron.....66⅔%
Gimp and Lace Tacks, Lanc., Swedes Iron, Tinned.....66⅔%
Gimp and Lace Tacks, S. S.....70%
Gimp and Lace Tacks Tinned, S. S..70%
Swedes Iron Basket or Trimmers' Tacks, Lanc.....66⅔%
Miners' Tacks, S. S 70%
Bill-Posters' or Railroad Tacks, Lanc., Swedes.....66⅔%
Bill-Poster's' or Railroad Tacks, S.S..70%
Copper Tacks.....50%
Copper Finish. & Trunk Nails.....50%
Cigar Box Nails.....50%
Zinc Glaziers' Points 50%
Picture-Frame Points.....50%
Looking-Glass Tacks.....50%
Brush Tacks.....50%
Tin-Capped Trunk Nails.....60%
Finishing Nails.....65%
Trunk & Clout Nails. Black & Tin'd.66⅔%
Common and Patent Brads.....60%
Hungarian Nails.....62½%
Basket and Chair Nails.....62½%
Leathered Carpet Tacks.....40%

Miscellaneous—
Double-Pointed.....82½%
Wire Carpet Nails.....50&10%

Wire Brads & Nails, see Nails, Wire.
Steel-Wire Brads, R. & E. Mfg. Co.'s list.....50&10%

Tap Borers—See Borers, Tap.

Tapes, Measuring—

American.....33⅓@33⅓&5%
Spring.....40%
Chesterman's, Regular list.....25@30%

Thermometers—

Tin Case.....80@80&10%

Thimble Skeins—See Skeins.

Ties, Bale- Steel

Standard Wire, list.....50&10&5%

Tinners' Shears, &c.—See Shears, Tinners', &c.

Tinware—

Stamped, Japanned and Pieced, list Jan. 20 1887.....70&10@70&10&5%

Tire Benders, Upsetters, &c—
See Benders and Upsetters, Tire.

Tools.

Coopers'—
Bradley's.....20%
Barton's.....20@20&5%
L. & I. J. White.....20&5%
Albertson Mfg. Co.....25%
Beatty's.....30%
Sandusky Tool Co.....30@30&5%
Shaves, Cincinnati Tool Co.....20%
Lumber.
Ring Peavies, "Blue Line"...₱ doz $20.00
Ring Peavies, Common.....₱ doz $18.00
Steel Socket Peavies.....₱ doz $21.00
Mall. Iron Socket Peavies.....₱ doz $19.00
Cant Hooks, "Blue Line"..₱ doz $16.00
Cant Hooks, Common Finish..₱ doz $14.00
Cant Hooks, Mall. Socket Clasp, "Blue Line" Finish.....$16.00
Cant Hooks, Mall. Socket Clasp, Common Finish.....₱ doz $14.50
Cant Hooks, Clip Clasp, "Blue Line" Finish.....₱ doz $14.00
Cant Hooks, Clip Clasp, Common Finish.....₱ doz $12.00
Hand Spikes....₱ doz 6 ft., $15.00; 8 ft., $20.00
Pike Poles, Pike & Hook, ₱ doz., 12 ft., $11.50; 14 ft., $12.50; 16 ft., $14.50; 18 ft., $17.50; 20 ft., $21.50.
Pike Poles, Pike only, ₱ doz, 12 ft., $10.00; 14 ft., $11.00; 16 ft., $13.00; 18 ft., $16.00; 20 ft., $20.00.
Pike Poles, not ironed, ₱ doz, 12 ft. $6.00; 14 ft., $7.00; 16 ft., $9.00; 18 ft., $12.00; 20 ft., $16.00.
Setting Poles, ₱ doz, 12 ft., $14.00; 14 ft., $15.00; 16 ft., $17.00
Swamp Hooks.....₱ doz $13.00
Saw.
Atkins' Perfection.....₱ doz $15.00
Atkins' Excelsior.....₱ doz $6.00
Atkins' Giant.....₱ doz $4.00

Tobacco Cutters—See Cutters, Tobacco.

Transom Lifters—See Lifters, Transom.

Traps—

Game—
Newhouse.....40@40&5%
Oneida Pattern.....70&10%
Game, Blake's Patent.....40&10&5%

Mouse and Rat—
Mouse Wood, Choker, ₱ doz holes, 11@12¢
Mouse, Round Wire.....₱ doz $1.50, 10%
Mouse, Cage, Wire.....₱ doz $2.50, 10%
Mouse, Catch-'em-alive....₱ dz $2.50 15%
Mouse, Bonanza.....₱ gr $10.00
Mouse Delusion.....₱ gr $15.00
Rat, Decoy.....₱ gr $10.00, 10%
Ideal.....₱ gr $10.00
Cyclone.....₱ gr $5.25
Hotchkiss Metallic Mouse, 5-hole traps, ₱ doz, 90¢; in full cases, ₱ doz....75¢
Hotchkiss Imp. Rat Killer..₱ gro $18.50
Hotchkiss New Rat Killer...₱ gro $16.50

Trowels—

Lothrop's Brick and Plastering.25@25&5%
Reed's Brick and Plastering.....15%
Disston's Br'k and Plastering, 25@25&10%
Peace's Plastering.....25%
Clement & Maynard's.....20%
Rose's Brick.....15@20%
Brade's Brick.....25%
Worrall's Brick and Plastering.....20%
Garden.....70%

Triers—

Butter and cheese.....25%

Trimmers, Spoke.

Bonney's.....₱ doz $10.00, 50%
Stearns'.....20&10%
Ives', No. 1, $15.00; No. 2, $12.00 ₱ doz. 55&10%
Douglas'.....₱ doz $9.00, 20%
Cincinnati.....25%

Trucks, Warehouse, &c.—

B. & L. Block Co.'s list, '82.....40%

Tubes, Boiler—
See Pipe.

Twine—

Flax Twine—	BC.	B.
No. 9, ¼ and ⅛ ℔ Balls	26¢	34¢
No. 12, ¼ and ⅛ ℔ Balls	25¢	33¢
No. 18, ¼ and ⅛ ℔ Balls	22¢	32¢
No. 24, ¼ and ⅛ ℔ Balls	22¢	32¢
No. 36, ¼ and ⅛ ℔ Balls	20¢	31¢

No. 264, Mattrass, ¼ and ⅛ ℔ Balls.52@54¢
Chalk Line, Cotton, ⅛ ℔ Balls.....25¢
Mason Line, Linen, ⅛ ℔ Balls.....55¢
2-Ply Hemp, ¼ and ⅛ ℔ Balls (Spring Twine).....15¼¢
3-Ply Hemp, 1 ℔ Balls.....16¢@16¼¢
3-Ply Hemp, 1¼ ℔ Balls.....15¢@15¼¢
Cotton Wrapping, 5 Balls to ℔ ..15¢@16¢
2, 3, 4 and 5-Ply Jute, ⅛ ℔ Balls.....10¢
Wool.....6¼¢@6¾¢
Paper.....13¢@14¢
Cotton Mops, 6, 9, 12 and 15 ℔ to doz..18¢

Vises—

Solid Box.....50&10@5 &10&5%
Parallel—
Fisher & Norris Double Screw.....15&10%
Stephens'.....25@30%
Parker's.....20@25%
Wilson's.....55%
Howard's.....40%
Bonney's.....40&10%
Millers Falls.....40@40&10%
Trenton.....40@5@40&10%
Merrill's.....15@20%
Sargent's.....60&10&10%
Backus and Union.....40%
Double Screw Leg.....15&10%
Prentiss.....20@25%
Simpson's Adjustable.....40%
Moore's.....30%
Saw Vises—
Bonney's, Nos. 2 & 3, $15.00.....40&10%
Stearn's.....33⅓&10@33⅓&10&10%
Stearn's Silent Saw Vises.....33⅓@35%
Sargent's.....66⅔&10%
Hopkins'.....₱ doz $17.50, 10%
Reading.....40&10%
Wentworth.....20&10%
Combination Hand Vises.....₱ gr $42.00
Cowell Hand Vises.....30%
Bauer's Pipe Vises.....10%
Cincinnati.....20&10%

Wagon Boxes—See Boxes, Wagon.

Washer Cutters—See Cutters Washer.

Wagon Jacks—See Jacks, Wagon.

Ware, Hollow, Enameled, &c.

Cast Iron, Hollow—
Stove Hollow-Ware—
Ground.....55&5@60&5%
Unground.....55&10@60&10&5%
White Enameled-Ware—
Maslin Kettles.....60&10&10%
Boilers and Saucepans.....40&5%
Tinned Boilers and Saucepans.....40&5%
Rustless Hollow-Ware.....50@50&5%
Gray Enameled-Ware—
Stove.....50%
Maslin Kettles.....60&10&10%
Boilers and Saucepans.....40&5%
Enameled—
Agate and Granite Ware, list Jan. 1, 1889.....33⅓&10%
Ironclad Enameled Ware...dis 33⅓&10%
Kettles—
Galvanized Tea-Kettles—

Inch....	6	7	8	9
Each....	55¢	60¢	65¢	75¢

Standard Fiber—

	Per Dozen. Plain.	Dec'r'd
Wash-Basins, 10½ in.	$2.00	$2.25
Wash-Basins, 12 in.	2.25	2.75
Keelers, 11½ in.		4.00
Cuspidors.		8.00
Spittoons, "Daisy," 8 in.	4.00	4.50
Peck Measure.	4.00	
Half-peck Measure.	3.50	

See also Pails.
Indurated Fiber—
Spittoons, No. 2, ₱ doz.....$9.00
Basins, Ringed, ₱ doz., No. 1, $4.80; No. 2, $4.20; No. 3.....$3.60
Washtubs, Nested, Nos. 0, 1, 2 and 3 (4 pieces), ₱ nest.....$7.50
Keelers, Nested, Nos. 1, 2, 3 and 4 (4 pieces), ₱ nest.....$3.70
Butter Bowls 15, 17 and 19-inch (3 pieces), ₱ nest.....$2.25
Liquid Measures, pt., qt., 2 qt. and funnell (4 pieces) ₱ set.....$4.00
Dry Measures, 1, 2, 4, 8 and 16 qts. (5 pieces), ₱ set.....$3.00
See also *Pails.*
Silver Plated, Hollow—
4 mo. or 5 % cash in 30 days.
Reed & Barton.....
Meriden Britannia Co.....
Simpson, Hall, Miller & Co.....
Rogers & Brother.....
} 40&5%
Hartford Silver Plate Co.....
William Rogers Mfg. Co.....
} 40&5&5%

Washers—

Size.	⅛	5-16	⅜	½	⅝	¾	1
Washers....	6½	5½	4½	3½	3	3	2

In lots less than 200 ℔, ₱ ℔, add ¼¢, 5-℔ boxes 1¢ to list.

Wedges—

Iron.....₱ ℔ 3½¢
Steel.....₱ ℔ 4 ¢

Weights, Sash—

Solid Eyes.....₱ ton $22.00

Well Buckets, Galvanized—See Buckets, Well, Galvanized.

Wheels, Well.
8 in., $2.25; 10 in., $2.70; 12 in., $3.25

Wire and Wire Goods—

Iron—
Market.
Br. & Ann., Nos. 0 to 18.....65%
Cop'd, Nos. 0 to 18.....60%
Galv., Nos. 0 to 18.....55%
Tin'd, Tinned list Nos. 0 to 18.....55%
Stone.
Br. and Ann'd, Nos. 16 to 18....67½%
Bright and Ann'd, Nos. 19 to 26.67½&5%
Br. and Ann'd, Nos. 27 to 36....70&10%
Tinned.....67½%
Tinned Broom Wire.....67½@67½&5%
Galvanized Fence.....55%
Annealed Fence, Nos. 8 and 9.....65%
Annealed Grape, Nos. 10 to 14.....60%
Brass, list Jan. 18, 1884.....25%
Copper, list Jan. 18, 1884.....25%
Barb Fence.....See Trade Report
Wire on Spools.....65%
Malin's Steel and Tin'd Wire on Spools, 50%
Malin's Brass and Cop. Wire on Spools 40%
Cast Steel Wire.....50%
Stubs' Steel Wire.....$6.00 to 2, 30
Steel Music Wire, Nos. 12 to 30..55¢ ₱
Picture Wire.....New list 50%
Barb Wire Safety Guards, ₱ 1000, $9.00, 25%
Wire Clothes Lines, see Lines.

Bright Wire Goods—
Standard list.....85%
Wire Cloth and Netting.
Painted Screen Cloth, good quality, ₱ 100 sq. ft., $1.80 @ $1.90
Galvanized Wire Netting.....70@70&10%

Wire Rope—See Rope, Wire.

Wrenches—

American Adjustable.....40%
Baxter's Adjustable "S".....40&10@50%
Baxter's Diagonal.....40&10@50%
Coes' Genuine.....50&3%
Coes' "Mechanics".....50&10&3%
Girard Standard.....65&10%
Machinists', Sterling Wrench Co. 70&10%
Lamson & Sessions' Engineers'.. 60&10%
Lamson & Sessions' Standard... 70&10%
Goes' Pattern, Wrought.....
Girard Agricultural.....
Lamson & Sessions' Agric'l..
Sterling Wrought.....
} 75@77&10
Bemis & Call's
Pat. Combination.....35%
Merrick's Pattern.....35%
Brigg's Pattern.....25%
Cylinder or Gas Pipe.....40&5%
No. 3 Pipe.....40&10%
Aiken's Pocket (Bright).....$6.00, 50&10%
The Favorite Pocket.....₱ doz $4.00, 40%
Webster's Pat. Combination.....25%
Boardman's.....20@10%
Always Ready.....25&5%
Alligator.....50%
Donohue's Engineer.....20&10%
Acme, Bright.....60&3%
Acme, Nickeled.....50&3%
Walker's.....55&3%
Diamond Steel.....55&3%
Cincinnati Brace Wrenches.....15&10%
Cincinnati Monkey Wrenches ..15&10%
Tafts' Vise Wrench.....55&10&3%

Wringers, Clothes—
List March 11, 1889, 2% cash.

Wrought Goods—
Staples, Hooks, &c, list Jan. 12, 1886, 80&15@85%

PAINTS, OILS AND COLORS.

Animal and Vegetable Oils.

Linseed, City, raw..per gal.	61	@	63
Linseed, City, boiled.....	64	@	66
Linseed, Western, raw.....	59	@	60
Lard, City, Extra Winter..	54	@	..
Lard, City, Prime, present make.....	...	@	52
Lard, City, Extra No. 1.....	45	@	48
Lard, City, No. 1.....	42	@	44
Lard, Western, prime.....	51	@	52
Cotton-seed, Crude, prime.	27½	@	28
Cotton-seed, Crude, off grades.....	26	@	27
Cotton-seed, Summer Yellow, prime.....	33½	@	34
Cotton-seed, Summer Yellow, off grades.....	32	@	33
Sperm, Crude.....	65	@	67
Sperm, Natural Spring.....	..	@	..
Sperm, Bleached Spring....	..	@	..
Sperm, Natural Winter.....	75	@	78
Sperm, Bleached Winter...	81	@	83
Whale, Crude.....	40	@	..
Whale, Natural Winter.....	46	@	..
Whale, Bleached Winter...	48	@	..
Whale, Extra Bleached.....	51	@	..
Sea Elephant, Bleached Winter.....	58	@	60
Menhaden, Crude, Sound...	22	@	23
Menhaden, Crude, Southern	..	@	..
Menh den, Light Pressed..	27	@	28
Menhaden, Bleached W'ter.	32	@	35
Menhaden, Extra Bleached	36	@	..
Tallow, City, prime.....	..	@	46
Tallow, Western, prime....	..	@	..
Cocoanut, Ceylon.....	5¾	@	5½
Cocoanut, Cochin.....	53	@	..
Cod, Domestic.....	31	@	32
Cod, Foreign.....	33	@	34
Red Elaine.....	36	@	38
Red Saponified..... ₱ ℔	..	@	4½
Bank.....per gal	25	@	26
Straits.....	27	@	28
Olive, Italian, bbls.....	90	@	92½
Neatsfoot, prime.....	62½	@	75
Palm, prime, Lagos....₱ ℔	5¼	@	05½

Mineral Oils.

Black, 29 gravity, 25 @ 30 cold test..... per gal	8	@	9
Black, 29 gravity, 15 cold test.....	8½	@	9½
Black, 29 gravity, summer.	6	@	7
Cylinder, light, filtered.....	15	@	20
Cylinder, dark, filtered	14	@	20
Cylinder, dard, at'm refined	10	@	18
Paraffine, 23½ @24 gravity.	11	@	12
Paraffine, 25 gravity.....	10	@	11
Paraffine, 28 gravity.....	8½	@	9
Paraffine, red, 21 @ 22 gr'ty	14	@	14½
Paraffine, red, 22½@23 gr'ty	12	@	13

Paints and Colors.

Barytes, Prime White..... ₱ ton.	$22.00	@	22.50
Barytes, Amer. refined...	20.00	@	....
Barytes, Amer. No. 1....	18.00	@	....
Barytes, Amer. No. 2.....	16.00	@	....
Baryte-, Amer., off-color.	13.00	@	14.00
Blue, Celestial.....₱ ℔	5½	@	7½
Blue, Chinese.....	45	@	50
Blue, Prussian.....	20	@	35
Blue, Ultramarine.....	7	@	25
Brown, Spanish.....	½	@	1
Brown, Vandyke, Amer..	3	@	3½
Brown, Vandyke, English	6	@	8
Black, American Drop....	8	@	10
Black, English Drop.....	12	@	14
Black, Frankfort, Drop...	5	@	18
Black, Lamp, common...	12	@	18
Black, Lamp, medium....	19	@	25
Black, Lamp, prime.....	27	@	33
Carmine, No. 40, in bulk.	3.10	@	..
Carmine, No. 40, in boxes or barrels.....	3.20	@	..
Carmine, No. 40, in ounce bottles.....	4.20	@	..
Chalk, in bulk.....₱ ton.	2.00	@	2.25
Chalk, in bbls..₱ 100 ℔	30	@	40
China Clay, English.... ₱ ton.	13.50	@	18.00
China Clay, Southern...	10.00	@	11.50
Cobalt Oxide, prep'd....	2.90	@	....
Cobalt Oxide, black.. lots 100℔.	2.60	@	....
Cobalt, Oxide, black..... less 100℔.	2.65	@	....
Crocus Martus, Engl.₱ ℔.	1½	@	2¼
Crocus, American.....	1½	@	2¼
Green, Paris, in bulk.....	12	@	12½
Green, Paris, 170 @ 175 ℔ kegs.....	12½	@	13
Green, Paris, small pack.	15	@	20
Green, Chrome, ordinary	8	@	11
Green, Chrome, extra....	12	@	13
Green, Chrome, pure....	22	@	25
Lead, White, dry in bbls		@	6¾
Lead, White, dry, in kegs.		@	7¼
Lead, White, in oil, keg lots 500 ℔.....		@	7¼
Lead, White, in oil, 25 ℔ tin pails.....		@	7¾
Lead, White, in oil, 12½ ℔ tin pails.....		@	8¼
Lead, White, in oil, 1 to 5 ℔ assorted tins.....		@	9¾
Lead, Red, pkgs. 500 ℔.....		@	7
Lead, Red, kegs.....		@	7¼
Litharge (pow'd), kegs.....		@	7¼

TERMS, &c.—Lead and Litharge.—On lots of 500 ℔ or over, 60 days' time or 2½ % discount for cash if paid within 15 days of date of invoice. Rebates, payable June 30 and December 31, if quantities specified are taken prior to those dates: To buyers of 3 tons and less than 10 tons, 4 %; 10 tons and less than 25 tons, 6%; 25 tons and less than 50 tons, 8 %; 50 tons and upward, 10%.

Ocher, Rochelle.....	1.35	@	1½
Ocher, French Washed...	1½	@	2½
Ocher, German Washed...	1½	@	3
Ocher, American.....	½	@	1¼
Orange Mineral, English...	8½	@	9½
Orange Mineral French....	9	@	9¾
Orange Mineral, German ..	8½	@	9½
Orange Mineral, American.	8	@	8½
Paris White, English Cliffstone.....	90	@	1.10
Paris White, American....	70	@	80
Red, Indian, English.....	5½	@	7
Red, Indian, American....	2	@	6
Red, Turkey.....	9	@	14
Red, Tuscan.....	9	@	11
Red, Venetian, American.. ₱ 100 ℔.	90	@	1.25
Red, Venetian, English....	1.00	@	1.45
Sienna, Italian, Burnt and Powd.₱ ℔.....	5	@	6½
Sienna, Ital., Burnt Lumps	1¾	@	3½
Sienna, Ital., Raw, Powd..	5	@	6½
Sienna, Ital., Raw Lumps..	2	@	3½
Sienna, American, Raw....	1½	@	1¾
Sienna, American, Burnt and Powdered.....	1½	@	1¾
Talc, French.....	1¼	@	1½
Talc, American.....	1	@	1¼
Terra Alba, Fr'ch. ₱ 100 ℔	72½	@	80
Terra Alba, English.....	80	@	85
Terra Alba, American No.1	70	@	75
Terra Alba, American No.2	38	@	40
Umber, Turkey, Bnt. and Powd..... ₱ ℔	3½	@	4
Umber, Turkey, Bnt. Lmps.	2¾	@	3
Umber, Turkey, Raw and Powdered.....	3½	@	4
Umber, Turkey, Raw, Lmps.	2½	@	4
Umber, Turkey, R'w Lmps	2½	@	2¾
Umber, Turkey, Bnt. Amer.	1¼	@	1¾
Umber, Turkey, R'w Amer.	1¼	@	1¾
Yellow, Chrome.....	10	@	25
Vermilion, Americ. Lead..	11½	@	13
Vermilion, Quicks'er, bulk.	..	@	68
Vermilion, Quicks'er, bags.	.	@	69
Vermilion, Quicksilver, smaller pkgs.....	..	@	73
Vermilion, English Import	82	@	85
Vermilion, Imitation, Eng.	8	@	25
Vermilion, Trieste.....	75	@	77
Vermilion, Chinese.....	88	@	90
Whiting, Common.₱ 100 ℔	40	@	45
Whiting, Gilders'.....	50	@	60
Zinc, American, dry....₱ ℔	4¼	@	4¾
Zinc, French, Red Seal....	..	@	7¾
Zinc, French, Green Seal..	..	@	7¾
Zinc, French, V. M. X....	6	@	6¾
Zinc, Antwerp, Red Seal...	..	@	6¾
Zinc, Antwerp, Green Seal	..	@	7¼
Zinc, German, L. Z. O....	..	@	6¼
Zinc, V M. in Poppy Oil, G. Seal, lots of 1 ton and over.....	10¼	@	10¾
lots less than 1 ton.....	10½	@	11
Zinc, V. M. in Poppy Oil, Red Seal.....	..	@	..
lots of 1 ton and over....	9¼	@	10
Lots of less than 1 ton....	9¾	@	10¼

DISCOUNTS.—French Zinc.—Discounts to buyers of 10- bbl. lots of one or assorted grades. 1 %; 25 bbls. 2 %, 50 bbls. 4 %. No discount allowed on less than bbl. lots.

Colors in Oil.

Blue, Chinese.....₱ ℔	35	@	40
Blue, Prussian.....	20	@	45
Blue, Ultramarine.....	12	@	18
Brown, Vandyke.....	7	@	12
Green, Chrome.....	8	@	13
Green, Paris.....	16	@	9¾
Sienna, Raw.....	7	@	13
Sienna, Burnt.....	7	@	13
Umber Raw.....	7	@	10
Umber, Burnt.....	7	@	10

Glue.

Low Grade.....₱ ℔	8	@	10
Cabinet.....	12	@	14
Medium White.....	13	@	15
Extra White.....	17	@	20
French.....	9	@	20
English.....	10	@	15
Irish.....	12	@	15

CURRENT METAL PRICES.

FEBRUARY 26, 1890.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.

Bar Iron from Store.

Common Iron :	
¾ to 2 in. round and square.. 1 to 6 in. x ⅜ to 1 in.....	₩ lb 2 10 @ ....¢
Refined Iron :	
¾ to 2 in. round and square.. 1 to 4 in. x ⅜ to 1¼ in..... 4½ to 6 in. x ⅜ to 1 in.....	₩ lb 2.30 @ ....¢
1 to 6 in. x ¼ and 5-16	₩ lb 2.50 @ ....¢
Rods—⅝ and 11-16 round and sq.	₩ lb 2.40 @ ....¢
Bands—1 to 6 x 3-16 to No. 12	₩ lb 2.60 @ ....¢
"Burden Best" Iron, base price.	₩ lb 3.00 @ ....¢
Burden's "H. B. & S." Iron, base price	₩ lb 2 80 @ ....¢
"Ulster"	₩ lb 3.10 @ ....¢
Norway Rods	4.00 @ 5.00¢

Merchant Steel from Store.

	Per pound.
Open-Hearth and Bessemer Machinery, Toe Calk, Tire and Sleigh Shoe, base price in small lots	2¾¢
Best Cast Steel, base price in small lots	8 ¢
Best Cast Steel Machinery, base price in small lots	5¢

Sheet Iron from Store.

	Common American.	R. G. Cleaned.
10 to 16	₩ lb 3.00 @ 3.00¢	3.50 @ ....¢
17 to 20	₩ lb 3.25 @ 3 25¢	3.50 @ 3.75 ¢
21 to 24	₩ lb 3.35 @ 3.35¢	3.75 @ ....¢
25 and 26	₩ lb 3 45 @	3.75 @ ....¢
27	₩ lb 3.55 @ 3.62½¢	4.00 @ ....¢
28	₩ lb 3.75 @ ... ..¢	4.25 @ ....¢
	B. B.	2d qual.
Galv'd, 14 to 20,	₩ lb. 5.00 @ ...	4.75½ @ ....¢
Galv'd, 21 to 24,	₩ lb, 5.37½ @ ...	5.12½ @ ....¢
Galv'd, 25 to 26,	₩ lb, 5.75 @ ...	5.50 @ ....¢
Galv'd, 27	₩ lb, 6.12½ @ ...	5.85½ @ ....¢
Galv'd, 28	₩ lb, 6.50 @ ..	6.23 @ ..¢
Patent Pianished	₩ lb A 10¢	B, 9¢
Russia	₩ lb 9½¢ @ 10¢	
American Cold Rolled B. B.	₩ lb 5¢ @ 7¢	
Craig Polished Sheet Steel	₩ lb, 8¼¢	

English Steel from Store.

Best Cast	₩ lb 15 ¢
Extra Cast	₩ lb 16½ @ 17 ¢
Swaged, Cast	₩ lb 16 ¢
Best Double Shear	₩ lb 15 ¢
Blister, 1st quality	₩ lb 12 ¢
German Steel, Best	₩ lb 10 ¢
2d quality	₩ lb 9 ¢
3d quality	₩ lb 8 ¢
Sheet Cast Steel, 1st quality	₩ lb 15 ¢
2d qualty	₩ lb 14 ¢
3d quality	₩ lb 12½¢

METALS.

Tin.

	Per lb
Banca, Pigs	23 ¢
Straits, Pigs	22½¢
English, Pigs	23 ¢
Straits in Bars	23¾¢

Tin Plates.

	Charcoal Plates.—Bright.	Per box.
Melyn Grade	IC, 10 x 14	@ $6.50
" "	IC, 12 x 12	@ 6.75
" "	IC, 14 x 20	@ 6.50
" "	IC, 20 x 28	@ 13.00
" "	IX, 10 x 14	@ 8.00
" "	IX, 12 x 12	@ 8.25
" "	IX, 14 x 20	@ 8.00
" "	IX, 20 x 28	@ 15.75
" "	DC, 12½ x 17	@ 6.00
" "	DX, 12½ x 17	@ 7.50
Calland Grade	IC, 10 x 14	@ 6.50
" "	IC, 12 x 12	@ 6.75
" "	IC, 14 x 20	@ 6.40
" "	IX, 10 x 14	@ 7.65
" "	IX, 12 x 12	@ 7.90
" "	IX 14 x 20	@ 7.65
Allaway Grade	IC, 10 x 14	@ 5.60
" "	IC, 12 x 12	@ 5.75
" "	IC, 14 x 20	@ 5.60
" "	IC, 20 x 28	@ 11.00
" "	IX, 10 x 14	@ 6.75
" "	IX, 12 x 12	@ 6.90
" "	IX, 14 x 20	@ 6.75
" "	IX, 20 x 28	@ 13.50
" "	DC, 12½ x 17	@ 5.30
" "	DX, 12½ x 17 .. 6 00	@ 6.30

	Coke Plates.—Bright.	
Steel Coke.	IC, 10 x 14, 14 x 20	@ $5.12½
	10 x 20	@ 7.25
	20 x 28	@ 10.25
	IX, 10 x 14, 14 x 20	@ 6.00
BV Grade.	IC, 10 x 14, 14 x 20	@ 4.87½

	Charcoal Plates.—Terne.	
Dean Grade.	IC, 14 x 20	@ $5.10
	20 x 28	@ 10.25
	IX, 14 x 20	@ 5.90
	20 x 28	@ 11.80
Abecarne Grade.	IC, 14 x 20	@ 4.87½
	20 x 28	@ 9.87½
	IX, 14 x 20	@ 5.80
	20 x 28	@ 11.60

Tin Boiler Plates.

XX, 14 x 26	112 sheets	$13.00 @ $13.00
XX, 14 x 28	112 sheets	@ 13 25
XX, 14 x 31	112 sheets	@ 14.75

Copper.

Duty: Pig, Bar and Ingot, 4¢; Old Copper, 3¢ ₩ lb. Manufactured (including all articles of which Copper is a component of chief value), 45 % ad valorem

Ingot.

Lake	@ 15¢
Baltimore Grade	@ 14¢

Sheet and Bolt.

Prices adopted by the Association of Copper Manufacturers of the United States, December 5, 1889, being quotations for all sized lots.

Not wider than	Not longer than	And longer than	Weights per square foot and prices per pound. Over 64 oz.	32 to 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30	72		22	22	22	23	24	25	28	30
30		72	22	22	22	23	25	27	31	....
36	96		22	22	22	24	26	30	33	....
36		96	22	22	23	25	27	31	35	....
48	96		22	22	24	26	28	32	....	....
48		96	22	22	25	27	29	33	....	....
60	96		22	22	27	29	34	....	....	....
60		96	22	23	28	31	....	....	....	....
84	96		23	24	29	33	....	....	....	....
84		96	24	25	30	35	....	....	....	....
Over 84 in. wide			25	27	....	....	....	....	....	....

	16 oz.	14 oz.	12 oz.	10 oz
All Bath Tub Sheets				
Per pound	$0.25	0.27	0 29	0.32

Bolt Copper, ⅝ inch diameter and over, per pound ..... 22¢

Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 60 inches diameter, up to 96 inches diameter, inclusive, 5 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Circles, over 96 inches diameter, 6 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Segment and Pattern Sheets, 3 cents per pound advance over price of sheets required to cut them from.

Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, 1 cent per pound over the foregoing prices.

Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, 2 cents per pound over the foregoing prices.

Copper Bottoms, Pits and Flats.

	Per pound.
14 ounce to square foot and heavier	26¢
12 ounce and up to 14 ounce to square foot	27¢
10 ounce and up to 12 ounce	29¢

Circles less than 8 inches diameter 2 cents per pound additional.

Circles over 13 inches diameter are not classed as Copper Bottoms.

Tinning.

Tinning sheets on one side, 10, 12 and 14 x 48 each	8¢
Tinning sheets on one side, 30 x 60 each	30¢
For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.), each	15¢
For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each	12¢
For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.) each	12¢
Tinning sheets on one side, other sizes, per square foot	2½¢

For tinning both sides double the above prices.

Planished Brass and Copper.

14 x 48.

14 and 16 oz. and heavier..31¢. By the case...30¢ ₩ lb
12 oz. and lighter.....33¢. By the case...32¢ ₩ lb

24 x 48 and 30 x 60.

14 and 16 oz. and heavier..44¢. 12 oz.....37¢ ₩ lb

Seamless Brass and Copper Tubes.

O. G.	N. G.	⅜	½	⅝	¾	⅞	1	1½
8-14	6-12	37	33	30	29	28	27	24
15	13	38	33	31	30	29	28	25
16	14	39	34	32	31	30	29	25
17	15	40	35	33	30	31	30	26
18	16	42	36	34	32	31	30	27
19	17	43	37	35	34	33	32	29
20	18-19	44	39	37	36	35	34	31
21	20	46	41	39	38	37	36	34
22	21	48	42	40	39	38	37	36
23	22	50	44	42	41	40	39	39
24	23	53	46	44	43	41	40	41
25	24	56	49	46	45	44	43	45

Copper, Bronze and Gilding Tube, 3¢ ₩ lb additional.

Brazed Brass Tubing. (To No. 20, inclusive.)

Above 5-16 inch to 3 inch, inclusive	35¢
Plain, above 3 inch	45¢
Plain, 5-16 inch	45¢
Plain, ¼ inch	60¢
Plain, 3-16 inch	$1.00
Plain, ⅛ inch	1.50
Fancy Tubing, Brass, to No. 20, inclusive	43¢ ₩ lb
Bronze Tubing, 3¢ ₩ lb more than Brass.	
Discount from list	25 @ ... %

Roll and Sheet Brass.

Discount from list ..... 25 %

High Brass Rods.

Over 1 inch diameter	27¢
¼ inch to 1 inch diameter, both inclusive	24¢
No. 8 and less than ¼ inch diameter	26¢
Smaller than No. 8	30¢
Hexagon, Octagon and Square, 2¢ ₩ lb advance over Round Rods.	

Spelter.

Duty: Pig, Bars and Plates, $1.50 ₩ 100 lb.

Western Spelter	6¼¢
"Bertha"	5¢

Zinc.

Duty: Sheet, 2½¢ ₩ lb.

600 lb casks	6¼¢
Per lb	7¼¢

Lead.

Duty: Pig, $2 ₩ 100 lb. Old Lead, 2¢ ₩ lb. Pipe and Sheets, 3¢ ₩ lb.

American	4¼¢
Newark	4¼¢
Bar	4½¢
Pipe, subject to trade discount	6 ¢
Tin-Lined Pipe, subject to trade discount	..15¢
Block Tin Pipes, subject to trade discount	45¢
Sheet, subject to trade discount	6¾¢

Solder.

½ @ ½ (Guaranteed)	14¾¢
Extra Wiping	12½¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony.

Cookson	₩ lb 29 ¢
Hallett's	" 21½¢

ALUMINUM.

Prices in Ingots.

$2.00 ₩ lb in lots of 1000 lb and over.
$2.25 ₩ lb in lots of 500 lb and over.
$2.50 ₩ lb in lots of 100 lb and over.

Prices Per Pound on Rolled Sheets.

(Brown & Sharpe, Standard Gauge.)

Wider than / And including	2 in. / 10 in.	10 in. / 14 in.	14 in. / 18 in.	18 in. / 22 in.	22 in. / 24 in.
Up to No. 20 inclusive	$2.50	$2.60	$2.80	$3.00	$3.20
Nos. 21, 22, 23 and 24	2.60	2.70	2.90	3 10	3.30
Nos. 25 and 26	2.70	2.80	3.00	3.20	3.40
Nos. 27 and 28	2.80	2.90	3.10	3.30	3.50

Sheets, thinner than No. 28 gauge and wider than 24 inches, special prices not less than $5 per pound.
Add 30 cents per pound for sheets cut to particular widths and lengths.
Sheets rolled to .001 in. and under, 50 cents per ounce.
Leaf in books, 20 cents per book; $2 per pack of 10 books, sheets 5 x 5 inches.

Aluminum Tubing.

From $4 per pound upward, according to size and thickness of walls.

Aluminum Castings.

From 50 cents upwards per pound extra over the cost of the metal in ingots, according to the number wanted, weight, the difficulty of casting, cost of patterns, &c.

Aluminum Wire in Coils.

(Brown & Sharpe, Standard Gauge.)

	Per lb
All numbers up to No. 14 (.064 in.) inclusive	$3.00
Nos. 15 (.05706 in.) to 22 (.0253 in.) inclusive	3.25
Nos. 23 (.02571 in.) and 24 (.0201 in.) inclusive	3.50
Nos. 25 (.0179 in.) and 26 (.01594 in.) inclusive	3.75
Nos. 27 (.014195 in.) and 28 (.012641 in.) inclusive	4.00
Nos. 29 (.011257 in.) and 30 (.010023 in.) inclusive	4.25
No. 31 (.008928 in.)	4.50
No. 32 (.00795 in.)	4.75
No. 33 (.00708 in.)	5.00
No. 34 (.00630 in.)	5.25
No. 35 (.00561 in.)	5.75
No. 36 (.00500 in.)	6.25
No. 37 (.00445 in.)	7.00
No. 38 (.003965 in.)	8.50
No. 39 (.003531 in.)	12.00
No. 40 (.003144 in.)	16.00

Spooling, on 1-pound spools, 15 cents per pound extra
Spooling, on 10-pound spools, 5 cents per pound extra